CPSC LOAD DEFLECTION TEST

FORK SIZE & TYPE	RECORD PRESSURE AT EACH INTERVAL OF COMPRESSION											
	.25	.50	.75	1.0	1.25	1.50	1.75	2.0	2.25	2.50		
CYLINDER CORRECTION	60	63	67	70	74	78	83	86	89	92	COMMENT / ENERGY	
BMX ALUMILITE MINI #B	180	290	380	485	540						0.3 DEFLECTION	
CORRECTED LBS	120	227	313	415	4606						654 IN/LBS	.272
BMX ALUMILITE MINI #C	165	270	370	470	550						0.25 DEFLECTION	
CORRECTED	105	207	303	400	4716						6026 IN-LBS	.322
BMX ALUMILITE MINI #A											.180 DEFLECTION	
CORRECTED	73	125	1164								181 IN-LBS	
EFC W/6061 CROWN 1" × 6 1/2 PSI₀=46	112	160	216	260	304	344	386	4116	430	444	PERMANENT DEF = 5/8	
CORRECTED												
EFC W/6061 CROWN 1 1/4" × PSI₀ = 46	108	156	212	264	306	350	376	400	420	456	PERMANENT DEF = 5/8	
CORRECTED												
EFC W/2024 CROWN 1 1/4" × PSI₀=40	108	174	220	260	308	344	380	404	428	428	PERMANENT DEF = 9/16	
CORRECTED												
EFC W/2024 CROWN 1" × PSI₀=44	116	180	232	292	340	388	428	4160	484	496	PERMANENT NO VISIBLE DEF = 5/16	
CORRECTED												
CORRECTED												

$$\frac{F_1+F_2+F_3+F_4}{2} + \frac{F_5}{4}$$

C:\JERRY\CPSC1.DRW

Enclosure 9: CPSC Cantilever Fork Test Reports

United States Testing Company, Inc.

291 FAIRFIELD AVENUE • FAIRFIELD, NEW JERSEY 07004 • 201-575-5252 • Fax: 201-575-8271

REPORT OF TEST

Engineering Services

CLIENT: Answer Products
27460 Avenue Scott
Valencia, CA 91355

NUMBER: 116543

December 8, 1995

SUBJECT: Physical Properties

REFERENCE:

Answer Products, Purchase Order No. 14164.

Sample Received: November 10, 1995

SAMPLE IDENTIFICATION:

Four (4) samples of bicycle forks were submitted and identified by the Client as follows:

1) P/N 85-7265 Export Mach5 Comp 96, 1 CM Thdlss
2) P/N 85-6945 Manitou Mach5 Pro 96, 1 1/8 CM Thdlss
3) P/N 85-6446 Manitou Mach5 SX 1 1/8 Alloy Thdlss
4) P/N 85-6456 Manitou Mach5 SX 1 1/4 Alloy Thdlss

TEST PERFORMED:

The submitted samples were tested for Load/Deflection in accordance with CPSC Standard for Bicycles, Federal Register Vol. 43, Part 1512 dated December 22, 1978. The test date was December 7, 1995.

Testing Supervised by:

Frank Savino

Frank Savino, Manager
Materials Engineering Section

SIGNED FOR THE COMPANY

By

Frank Pepe, Director
Engineering Services

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United States Testing Company, Inc.

LIENT: Answer Products NUMBER: 116543

TEST PROCEDURE AND RESULTS:

The forks were subjected to the load/deflection test and found to absorb the required 350 in.-lbs. within the 2-1/2 inch deflection without evidence of fracture. The data was as follows:

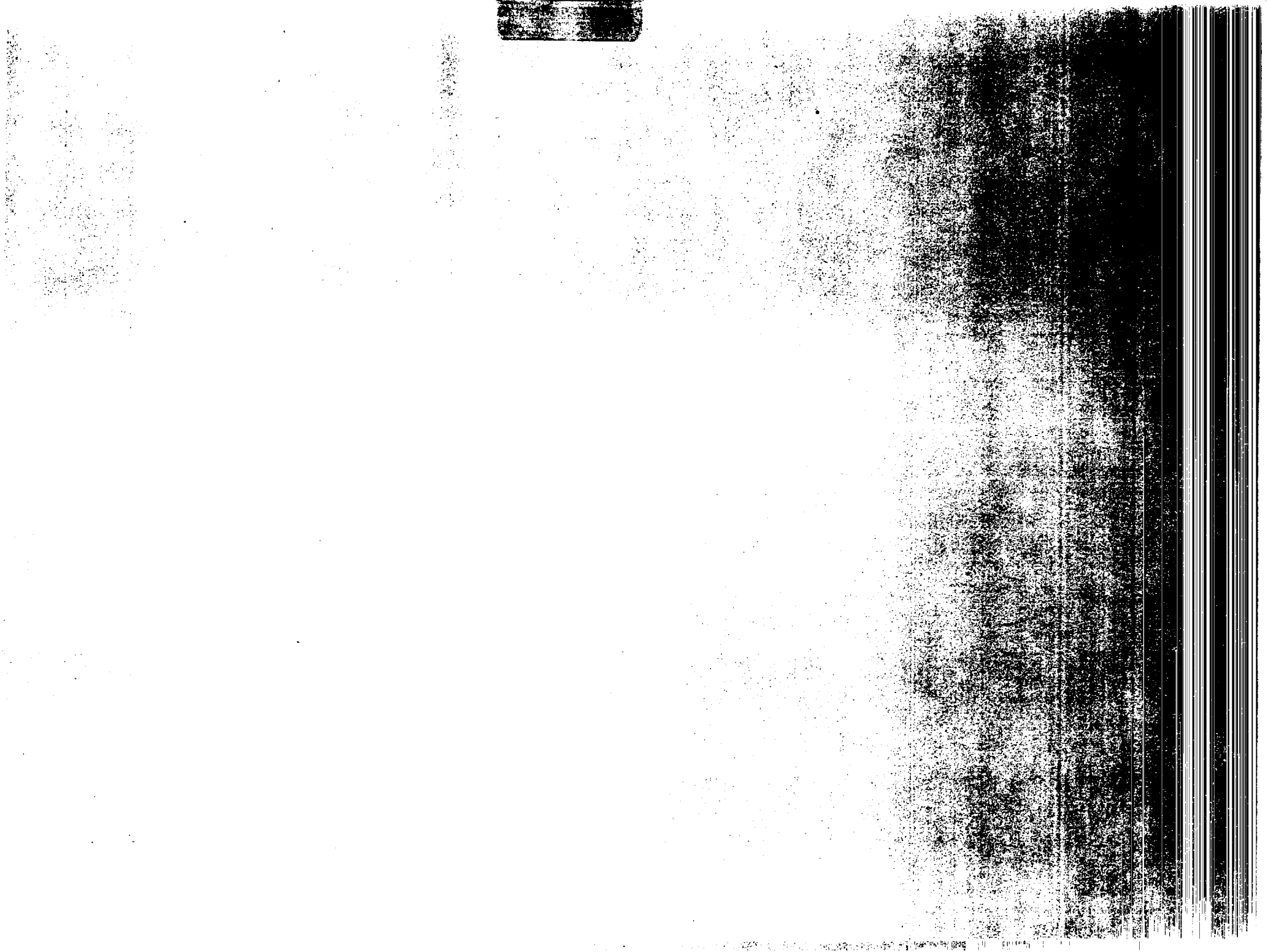
Sample	Deflection, IN	Load, LBS	Total Energy, in.-lbs.
P/N 85-7265	1/4	51	6.38
	1/2	100	25.26
	3/4	146	56.01
	1	190	98.01
	1-1/4	230	150.51
	1-1/2	266	212.51
	1-3/4	292	282.26
	2	312	357.76
	2-1/4	336	438.76
	2-1/2	358	525.51
P/N 85-6945	1/4	43	5.38
	1/2	90	22.00
	3/4	152	52.25
	1	195	95.63
	1-1/4	240	150.01
	1-1/2	276	214.51
	1-3/4	312	288.01
	2	346	370.26
	2-1/4	360	458.51
	2-1/2	378	550.76
P/N 85-6446	1/4	42	5.25
	1/2	90	21.75
	3/4	136	50.00
	1	182	89.75
	1-1/4	224	140.50
	1-1/2	268	202.00
	1-3/4	300	273.00
	2	338	352.75
	2-1/4	376	442.00
	2-1/2	404	539.50

United States Testing Company, Inc.

CLIENT: Answer Products NUMBER: 116543

TEST PROCEDURE AND RESULTS: (Cont'd)

Sample	Deflection, IN	Load, LBS	Total Energy, in.-lbs.
P/N 85-6456	1/4	60	7.50
	1/2	108	28.50
	3/4	150	60.75
	1	188	103.00
	1-1/4	224	154.50
	1-1/2	270	216.25
	1-3/4	306	288.25
	2	340	369.00
	2-1/4	376	458.50
	2-1/2	410	556.75



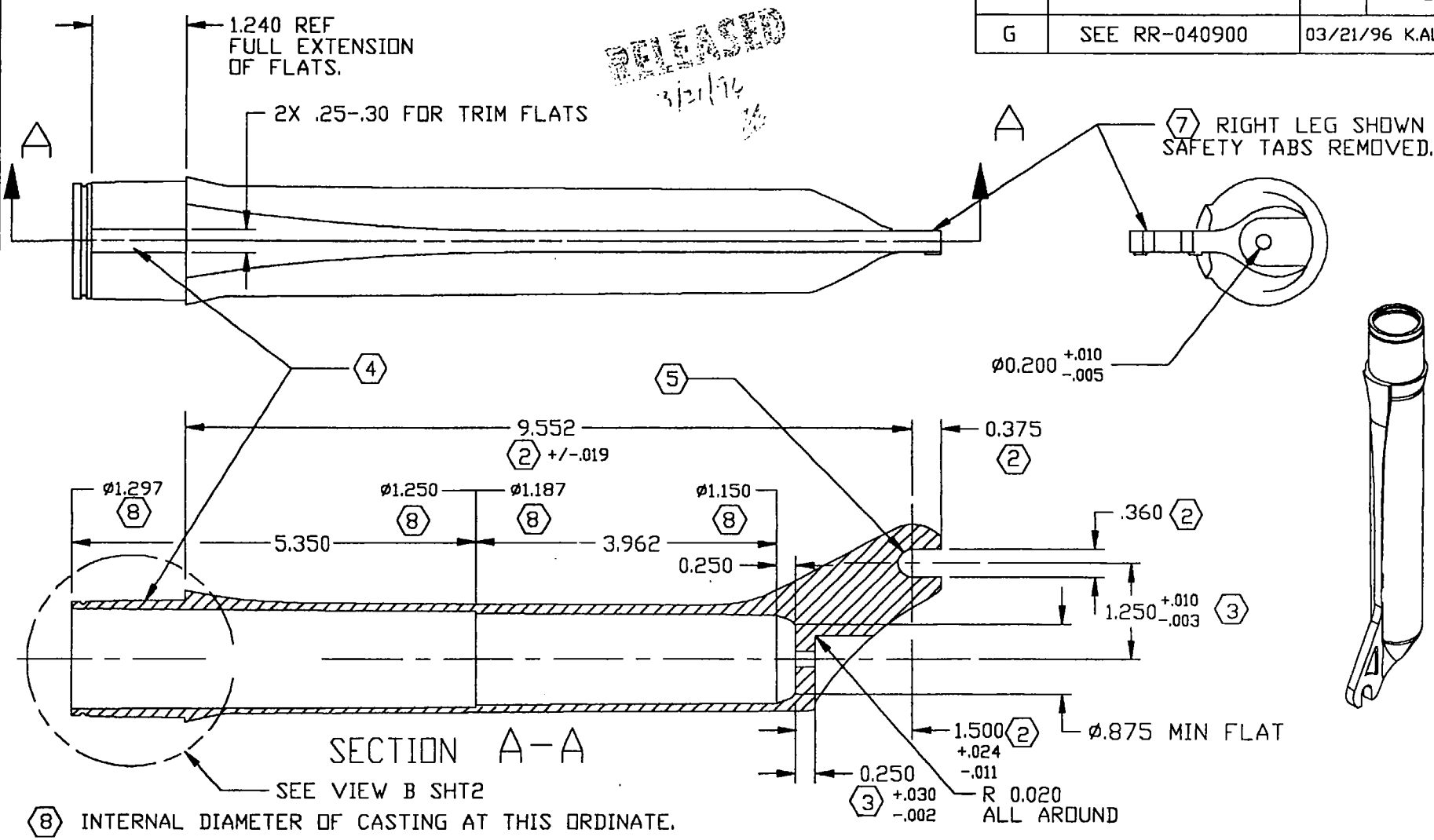
15b. Copies of all engineering drawings, engineering change notices and material specifications relevant to the identified problem.

See Enclosures:

1.) Engineering Drawings and Revision Records
2.) Die Cast Specifications
3.) NADCA C-8-1-94 Checklist for Die Cast Production Part Purchasing
4.) Northern Die Cast FMEA (Failure Mode Effects Analysis)

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
G	SEE RR-040900	03/21/96	K.ALLEN

RELEASED 3/21/96



8 INTERNAL DIAMETER OF CASTING AT THIS ORDINATE.

7 RIGHT OUTER SHOWN, LEFT OUTER MIRRORS RIGHT LEG GEOMETRY.

6 REFER TO DIE CAST PRODUCT SPEC. PER NADCA, C-8-1-94 FOR CAST OUTER, 040900, RFQ DATED 10/28/94

5 BROACH FULL RADIUS DURING TRIM OPERATION.

4 FLATS CAN BE ADDED ON TAPERED DIA ALONG PARTING LINE TO AID TRIMMING OPERATION.

3 HOLD PRECISION CASTING TOLERANCE PER NADCA PRODUCT SPECIFICATIONS STANDARDS FOR DIE CASTINGS.

2 HOLD STANDARD CASTING TOLERANCE PER NADCA PRODUCT SPECIFICATIONS STANDARDS FOR DIE CASTINGS.

1. REFERENCE CAD DATABASE FOR ALL DIMENSIONS.

CASTING DWG.

AZ91D	ASTM B94-93
MATERIAL	SPECIFICATION

ANSWER PRODUCTS
28209 AVE. STANFORD
VALENCIA CA. 91355

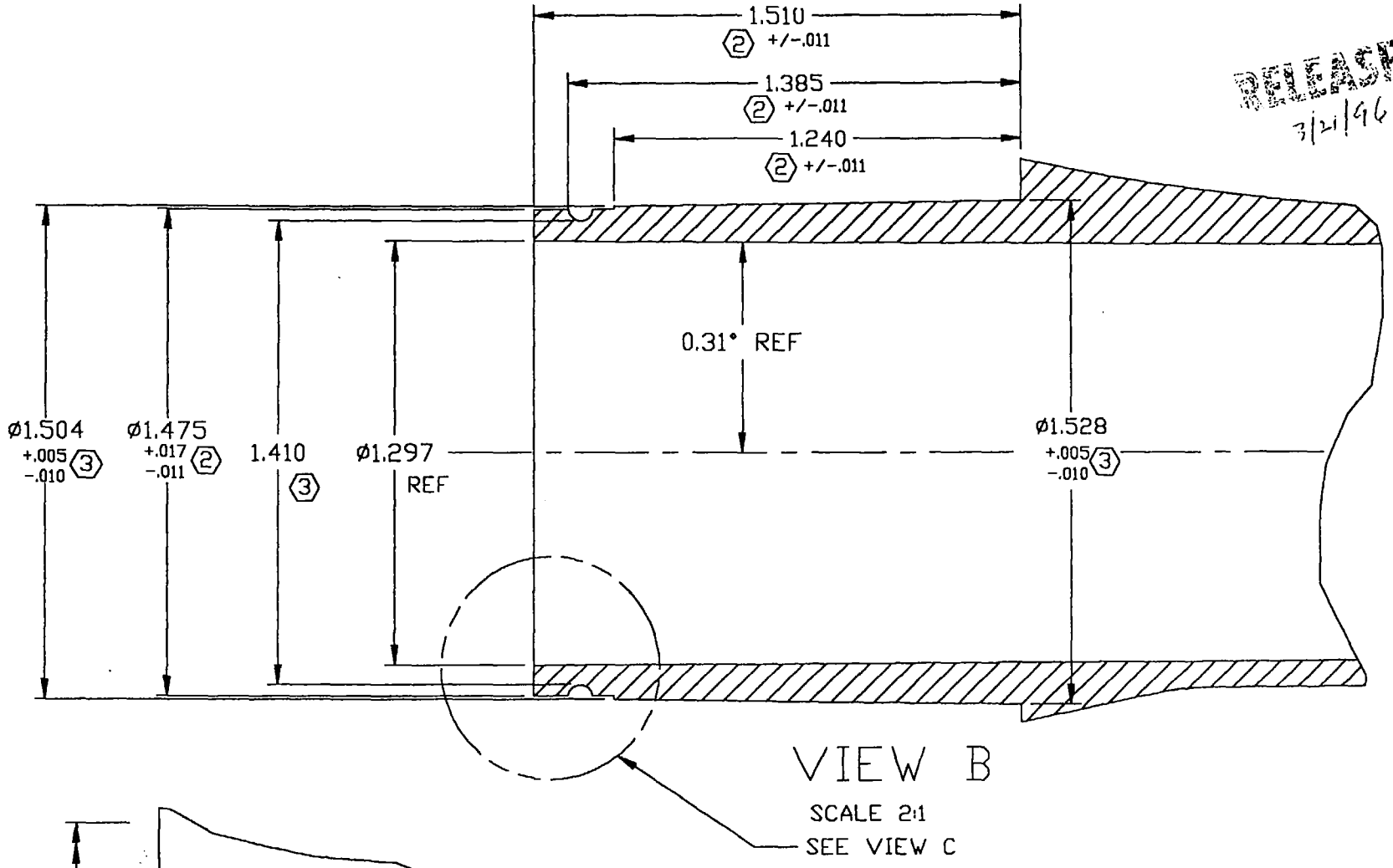
96/97 RIGHT & LEFT OUTER CAST

UNLESS OTHERVISE SPECIFIED DIMENSIONS ARE IN INCHES AND APPLY PRIOR TO FINISH 125/ MACH. SURF. ROUGHNESS

TOLERANCES ON: ANGLES +/- 0° 30' DECIMALS .XX +/-.030 .XXX +/-.010

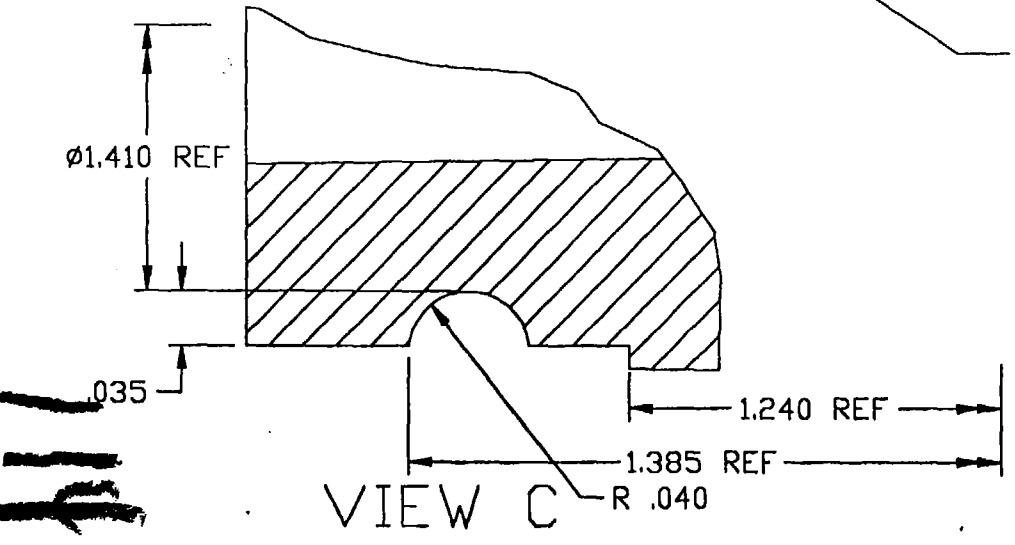
PART NO. 040900-G

DRWN K. ALLEN DATE 12/06/94 SCALE 50% SHEET 1 OF 2



RELEASED
3/21/96 JW

VIEW B
SCALE 2:1
SEE VIEW C



VIEW C
SCALE 8:1

CASTING DWG.

ANSWER PRODUCTS
28209 AVE. STANFORD
VALENCIA CA. 91355

PART NO. 040900-G
SCALE NOTED
SHEET 2 OF 2

REVISION RECORD

REV	DESCRIPTION	1. MAY BE REWORKED 2. CANNOT BE REWORKED 3. RECORD CHANGE 4. NOW SHOP PRACTICE 5. PARTS MADE OK	DISPN	DATE APPROVED
A	LAST RELEASE DATE 2/03/95 1. IS 9.552 WAS 9.562 2. ADDED BUG NOTE ⟨7⟩ 3. REMOVED SAFETY TABS TO CREATE RIGHT AND LEFT OUTER LEGS. 4. IS 1.500 WAS 1.250. CHANGED DIMENSIONING SCHEME 5. IS OUTER LEG, RIGHT & LEFT DIE CAST WAS OUTER, M5 DIE CAST. 6. ADDED DIMENSION R .020		3	05/02/95 K. ALLEN
B	1. IS $\varnothing 1.504^{+.005}_{-.010}$ WAS $\varnothing 1.493^{+.007}_{-.003}$ 2. IS $\varnothing 1.528^{+.005}_{-.010}$ WAS $\varnothing 1.523^{+.007}_{-.003}$ DIMENSIONS UPDATED TO ACCOMODATE AS CAST DIMENSIONS		3	06/08/95 K. ALLEN
C	1. ADDED DIMENSION $\varnothing 0.200^{+.010}_{-.005}$ TO CLARIFY DRAWING. DIMENSION WAS ADDED TO CLARIFY DRAWING AS TO THOSE CRITICAL DIMENSIONS WHICH APPEAR IN THE CADD DATABASE		5	08/02/95 K. ALLEN
D	1. IS $0.250^{+.030}_{-.002}$ WAS $0.250^{+.016}_{-.002}$ TOLDERANCE ADJUSTED TO ACCOMADATE ACCEPTABLE DIMENSIONS ON PRODUCTION PARTS RUN WITH NEW CORES.		5	09/06/95 K. ALLEN
E	1. REVISION TO DROPOUT REGION. REMOVED BLIND WINDOW INSIDE DROPOUT SURFACE, REDUCED DEPTH OF BLIND ON OUTSIDE SURFACE OF DROPOUT REGION FROM 0.075 TO 0.050. NOT SHOWN ON THIS DRAWING. THIS REVISION WAS ADDED ON 2/20/96 TO TRACK THE CHANGE TO THE DROPOUT.		3	11/10/95 K. ALLEN
F SHT2	1. THE FOLLOWING DIMENSIONS ADDED TO DRAWING TO DESCRIBE THE NEW 1997 CORE. ø1.289, ø1.223, ø1.174, ø1.140. 6.100, 3.462, 0.250 2. ADDED BUG NOTE ⟨8⟩ INTERNAL DIAMETER OF CASTING.... 3. IS ø1.289 WAS ø1.220 4. IS 0.30° WAS 0.75° DRAWING UPDATED TO REFLECT 1997 CORE TO BE USED ON 1997 PRO, RIGHT AND LEFT LEGS.		3	2/20/96 K. ALLEN 15

ANSWER PRODUCTS
27460 AVE. SCOTT
VALENCIA CA. 92355

RR-040900

SHEET 1 OF 1

REV G

REVISION RECORD

REV	DESCRIPTION	1. MAY BE REWORKED 2. CANNOT BE REWORKED 3. RECORD CHANGE 4. NOW SHOP PRACTICE 5. PARTS MADE OK	DISPN	DATE APPROVED
G	1. IS 5.350 WAS 6.100 2. IS 3.962 WAS 3.212 3. IS Ø1.150 WAS Ø1.141 4. IS Ø1.297 WAS Ø1.289 5. IS Ø1.187 WAS Ø1.173 6. IS Ø1.250 WAS Ø1.223 MODIFICATION TO COR BASED ON MOST RECENT DRAWING FROM NORTHERN DIE CAST, MARK DIETZ DATED 3/15/96, TITLED		3	3/21/96 K. ALLEN

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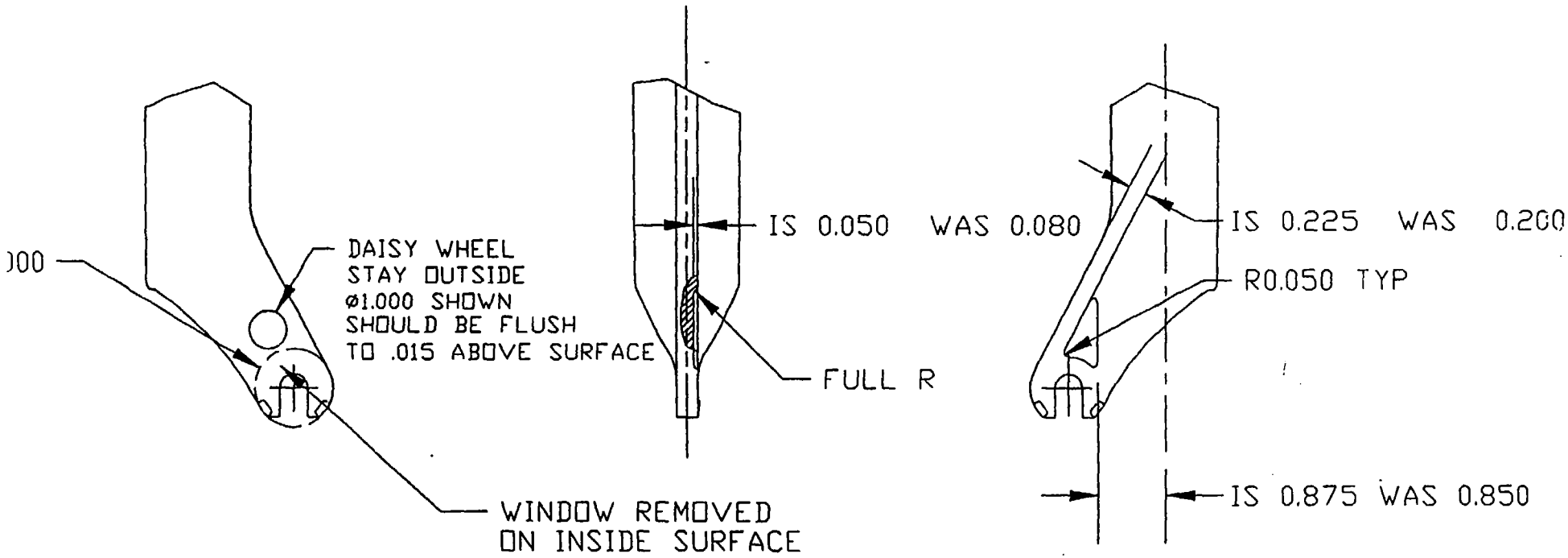
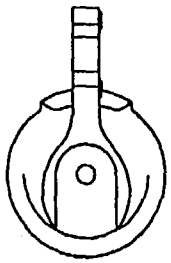
ANSWER PRODUCTS
27460 AVE. SCOTT
VALENCIA CA. 92355

RR-040900

SHEET 1 OF 1

REV
G





LEG OUTER LEG SHOWN
RIGHT LEG MIRRORS LEFT LEG
11/10/95

Designation: B 94 – 94

AMERICAN SOCIETY FOR TESTING AND MATERIALS
1916 Race St. Philadelphia, Pa 19103

Standard Specification for Magnesium-Alloy Die Castings[1]

This standard is issued under the fixed designation B 94; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This specification has been approved for use by agencies of the Department of Defense. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

1. Scope*

1.1 This specification covers magnesium-alloy die castings. Four alloy compositions are specified, designated as shown in Table 1.[2]

1.2 The values stated in inch-pound units are standard. The SI values in parentheses are provided for information only.

2. Referenced Documents

2.1 The following documents of the issue in effect on date of order acceptance form a part of this specification to the extent referenced herein:

2.2 *ASTM Standards:*

B 93/B 93M Specification for Magnesium Alloys in Ingot Form for Sand Castings, Permanent Mold Castings, and Die Castings[3]

B 275 Practice for Codification of Certain Nonferrous Metals and Alloys, Cast and Wrought[3]

B 557 Methods of Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products[3]

B 660 Practices for Packaging/Packing of Aluminum and Magnesium Products[3]

E 23 Test Methods for Notched Bar Impact Testing of Metallic Materials[4]

E 29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications[5]

E 35 Test Methods for Chemical Analysis of Magnesium and Magnesium Alloys[6]

E 88 Practice for Sampling Nonferrous Metals and Alloys in Cast Form for Determination of Chemical Composition[6]

E 505 Reference Radiographs for Inspection of Aluminum and Magnesium Die Castings[7]

E 527 Practice for Numbering Metals and Alloys (UNS)[8]

2.3 *American Die Casting Institute:*

"E" Series Product Standards[3]

2.4 *Federal Standards:*

Fed. Std. No. 123 Marking for Shipment (Civil Agencies)[9]

Fed. Std. No. 184 Identification Marking of Aluminum, Magnesium and Titanium[9]

2.5 *Military Standard:*

MIL-STD-129 Marking for Shipment and Storage[9]

3. Terminology

3.1 *Definition:*

3.1.1 *die casting*—a metal object produced by the introduction of molten metal under substantial pressure into a metal die and characterized by a high degree of fidelity to the die cavity.

4. Ordering Information

4.1 Orders for die castings shall include the following basic information:

4.1.1 This specification number and date,

4.1.2 Quantity and delivery schedule, as required,

4.1.3 Part name and number,

4.1.4 Alloy (Table 1), and

4.1.5 Drawing of die casting, when required, giving all necessary dimensions and showing latest revisions and allowances for machining, if any. Location of ejector pin marks or parting lines shall be at the option of the producer, unless specifically designated on the drawing.

4.2 Additional tests, options and special inspection requirements as provided below should be justified only on the basis of need. These shall be specified in the contract or purchase order, as additional procedures and extended delivery time may be involved.

4.2.1 Chemical analysis (7.1.1),

4.2.2 Quality assurance (Section 6),

4.2.3 Special proof tests or mechanical properties (Section 8),

4.2.4 General quality options for internal soundness or for finish (Section 10),

4.2.5 Source inspection (Section 11),

[1] This specification is under the jurisdiction of ASTM Committee B-7 on Light Metals and Alloys, and is the direct responsibility of Subcommittee B07.04 on Magnesium Alloy Cast and Wrought Products.

Current edition approved Feb. 15, 1994. Published April 1994. Originally published as B 94 – 34 T. Last previous edition B 94 – 93.

[2] SAE specifications No. 501 and 501A conform to the requirements for Alloy AZ91A and AZ91B respectively.

[3] *Annual Book of ASTM Standards*, Vol 02.02.

[4] *Annual Book of ASTM Standards*, Vol 03.01.

[5] *Annual Book of ASTM Standards*, Vol 14.02.

[6] *Annual Book of ASTM Standards*, Vol 03.05.

[7] *Annual Book of ASTM Standards*, Vol 03.03.

[8] *Annual Book of ASTM Standards*, Vol 01.01.

[9] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094, Attn: NPODS.

* A Summary of Changes section appears at the end of this specification.

TABLE 1 Chemical Requirements[A,B,C,D]

Element	Composition, %							
	UNS M10600 (Alloy AM60A)	UNS M10410 (Alloy AS41A)	UNS M10412 (Alloy AS41B)	UNS M11910 (Alloy AZ91A)	UNS M11912 (Alloy AZ91B)	UNS M11916 (Alloy AZ91D)	UNS M10602 (Alloy AM60B)	UNS M10500 (Alloy AM50A)
Magnesium	remainder	remainder	remainder	remainder	remainder	remainder	remainder	remainder
Aluminum	5.5–6.5	3.5–5.0	3.5–5.0	8.3–9.7	8.3–9.7	8.3–9.7	5.5–6.5	4.4–5.4
Manganese	0.13–0.6	0.20–0.50	0.35–0.7[E]	0.13–0.50	0.13–0.50	0.15–0.50[E]	0.24–0.6[E]	0.26–0.6[E]
Zinc	0.22	0.12	0.12	0.35–1.0	0.35–1.0	0.35–1.0	0.22 max	0.22
Silicon	0.50	0.50–1.5	0.50–1.5	0.50	0.50	0.10	0.10	0.10
Copper	0.35	0.06	0.02	0.10	0.35	0.030	0.010	0.010
Nickel	0.03	0.03	0.002	0.03	0.03	0.002	0.002	0.002
Iron, max	...	...	0.0035[E]	...	...	0.005[E]	0.005[E]	0.004[E]
Other metallic impurities, max, each	...	...	0.02	...	...	0.02	0.02	0.02

[A] Analysis shall regularly be made only for the elements specifically mentioned in this table. If, however, the presence of other elements is suspected or indicated in the course of routine analysis, further analysis shall be made to determine that these other elements are not in excess of 0.3 %.

[B] The following applies to all specified limits in this table: For purposes of acceptance and rejection an observed value or a calculated value obtained from analysis should be rounded to the nearest unit in the last right-hand place of figures used in expressing the specified limit in accordance with the rounding procedure prescribed in Section 3 of Practice E 29.

[C] Where single units are shown, these indicate the maximum amounts permitted.

[D] ASTM alloy designations were established in accordance with Practice B 275, UNS designations were established in accordance with Practice E 527.

[E] In alloys AS41B, AM50A, AM60B, and AZ91D, if either the minimum manganese limit or the maximum iron limit is not met, then the iron/manganese ratio shall not exceed 0.010, 0.015, 0.021, and 0.032, respectively.

4.2.6 Certification (Section 12),
4.2.7 Marking for identification (Section 14), and
4.2.8 Special packaging (Section 15).

5. Materials

5.1 The magnesium alloys used for the manufacture of die castings shall be such that the die castings produced will conform to the chemical composition requirements of this specification. Ingot in accordance with Specification B 93/B 93M may be used but is not restricted to this source.

6. Quality Assurance

6.1 *Responsibility for Inspection*—When specified in the contract or purchase order, the producer or supplier is responsible for the performance of all inspection and test requirements specified herein. Except as otherwise specified in the contract or order, the producer or supplier may use his own or any other suitable facilities for the performance of the inspection and test requirements specified herein, unless disapproved by the purchaser. The purchaser shall have the right to perform any of the inspections and tests set forth in this specification. Quality assurance standards shall be agreed upon between the producer or supplier and purchaser at the time a contract or order is placed.

6.2 *Lot Definition*—An inspection lot shall be defined as follows:

6.2.1 An inspection lot shall consist of the production from each die or compound die on each machine for each 24 h during the first week of normal operation and the production for each 48 h thereafter of normal operation. Any significant change in the machine, composition, die or continuity of operation shall be considered as the start of a new lot. Die castings inspected by this method shall be so marked or handled during the finishing operations as not to lose their identity.

6.2.2 Each die casting of a randomly selected sample shall be examined to determine conformance to the requirements with respect to general quality, dimensions and identification marking. The producer or supplier may use a system of statistical quality control for such examinations.

7. Chemical Composition

7.1 *Limits*—The die casting shall conform to the requirements as to chemical composition prescribed in Table 1. Conformance shall be determined by the producer by analyzing samples taken at the time castings are made. If the producer has determined the chemical composition of the metal during the course of manufacture, he shall not be required to sample and analyze the finished product.

7.1.1 When a detailed chemical analysis is required with a shipment, it shall be called for in the contract or purchase order.

7.1.2 If the producer's or supplier's method of composition control is acceptable, sampling for chemical analysis may be waived at the discretion of the purchaser.

7.2 *Number of Samples*—When required, samples for determination of chemical composition shall be taken to represent the following:

7.2.1 A sample shall be taken from each of two representative castings selected from each lot defined in Section 6.2.1.

7.3 *Methods of Sampling*—Samples from die castings for determination of chemical composition shall be taken in accordance with one of the following methods:

7.3.1 Samples for chemical analysis shall be taken from the material by drilling, sawing, milling, turning, or clipping a representative piece or pieces to obtain a weight of prepared sample not less than 75 g. Sampling shall be in accordance with Practice E 88.

7.3.2 By agreement, an appropriate spectrographic sample may be prepared at time of manufacture.

7.3.3 The method of sampling cast products for spectrochemical and other methods of analysis shall be suitable for the form of material being analyzed and the type of analytical method used.

7.4 *Method of Analysis*—The determination of chemical composition shall be made in accordance with suitable chemical (Test Methods E 35), spectrochemical, or other methods. In case of dispute, the results secured by Test Methods E 35 shall be the basis of acceptance.

8. Mechanical Properties and Tests

8.1 Unless specified in the contract or purchase order or

specifically guaranteed by the manufacturer, acceptance of die castings under these specifications shall not depend on mechanical properties determined by tension or impact tests. Table X1.1 and X1.2 show typical mechanical properties and characteristics. When tension or impact tests are made, the tension test specimen shown in Fig. 13 of Methods B 557, and the impact test specimen shown in Fig. 6 of Test Methods E 23 shall be used.

8.2 When specified in the contract or purchase order, die castings shall withstand proof tests without failure as defined by agreement between the purchaser and the producer or supplier.

9. Permissible Variations in Dimensions

9.1 Permissible variations in dimensions shall be within the limits specified on the drawings or in the contract or purchase order.

9.1.1 Any dimensions for which a tolerance is not specified shall be in accord with ADCI Product Standard Series E 1 to E 16 inclusive.

9.2 Dimensional tolerance deviations waived by the purchaser shall be confirmed in writing to the producer or supplier.

10. General Quality

10.1 *Internal Soundness*—When specified, the soundness of die castings shall conform to standards or requirements agreed upon between the producer or supplier and the purchaser. The number and extent of imperfections shall not exceed those specified by the purchaser. The standards or requirements may consist of radiographs in accordance with Reference Radiographs E 505, photographs, or sectioned die castings.

10.2 Imperfections inherent in die castings shall not be cause for rejection provided it is demonstrated that the die castings are in accordance with the requirements and standards agreed upon.

10.3 *Workmanship*—Die castings shall be of uniform quality, free from injurious discontinuities that will adversely affect their serviceability.

10.4 *Finish*—When specified in the contract or purchase order the as-cast surface finish required shall conform to standards agreed upon between the purchaser and the producer or supplier, or as prescribed in ADCI Product Standard E 18.

10.5 *Pressure Tightness*—When specified in the contract or purchase order the pressure tightness of die castings shall conform to standards agreed upon between the purchaser and the producer or supplier, or as prescribed in ADCI Product Standard E 17.

11. Source Inspection

11.1 If the purchaser desires that his representative inspect or witness the inspection and testing of the product prior to shipment, such agreement shall be made by the purchaser and producer or supplier as part of the contract or purchase order.

11.2 When such inspection or witness of inspection and testing is agreed upon, the producer or supplier shall afford the purchaser's representative all reasonable facilities to satisfy him that the product meets the requirements of this specification. Inspection and tests shall be conducted so there is no unnecessary interference with the producer's operations.

12. Rejection and Retest

12.1 When one or more samples, depending on the approved sampling plan, fail to meet the requirements of this specification, the represented lot is subject to rejection except as otherwise provided in 12.2.

12.2 Lots rejected for failure to meet the requirements of this specification may be resubmitted for test provided:

12.2.1 The producer has removed the nonconforming material or the producer has reworked the rejected lot as necessary to correct the deficiencies.

12.3 Individual castings that show injurious imperfections during subsequent manufacturing operations may be rejected. The producer or supplier shall be responsible only for replacement of the rejected castings to the purchaser. As much of the rejected original material as possible shall be returned to the producer or supplier.

13. Certification

13.1 The producer or supplier shall, when called for in the contract or purchase order, furnish to the purchaser a certificate of inspection stating that each lot has been sampled, tested, and inspected in accordance with this specification, and has been found to meet the requirements specified.

14. Product Marking

14.1 When specified in the contract or purchase order, all castings shall be properly marked for identification with the part number, name or brand of the producer, as agreed upon. Government applications shall be marked in accordance with Fed. Std. No. 184.

15. Packaging, Marking, and Storage

15.1 *Packaging*—Unless otherwise specified, the die castings shall be packaged to provide adequate protection during normal handling and transportation. Each package shall contain only one type of item unless otherwise agreed upon. The type of packaging and gross weight of containers shall, unless otherwise agreed upon, be at the producer's discretion, provided they are such as to ensure acceptance by common or other carriers for safe transportation at the lowest rate to the delivery point.

15.2 *Marking*—Each shipping container shall be legibly marked with the purchase order number, gross and net weights, and the supplier's name or trademark. Marking for shipment shall be in accordance with Fed. Std. No. 123 for civil agencies and MIL-STD-129 for Military agencies.

15.3 *Preservation*—Material intended for prolonged storage in unheated locations shall be adequately packed and protected to avoid deterioration and damage. When specified in the contract or purchase order, material shall be preserved, packaged, and packed in accordance with the requirements of Practices B 660. The applicable levels shall be as specified in the contract or order.

16. Keywords

16.1 casting characteristics; composition; high pressure die cast alloy; mechanical properties; performance characteristics

APPENDIXES

(Nonmandatory Information)

X1. MECHANICAL PROPERTIES AND CHARACTERISTICS

X1.1 Table X1.1 shows certain casting and other outstanding characteristics which are usually considered in selecting a magnesium die casting alloy for a specific application. A number 1 rating is the highest.

X1.2 The use of separately die-cast test bars was omitted from this specification revision because they are considered unreliable. Different machines and dies continue to be necessary for die castings and test bars. Comparison between static breakdown or proof test and the mechanical properties of separately die-cast test bars revealed that test bars made in a different machine in a different die had no correlation with the die casting, other than a common chemical composition. For this reason, it is considered that the only practical method is to have mechanical property control based on proof testing of whole die castings. For information only, typical separately die-cast specimen tensile properties are presented in Table X1.2. These properties are of tension specimens of the form and dimensions shown in Fig. 13 in Methods B 557 and Fig. 6 of Test Methods E 23, when cast in a die in regular production routine and conforming to the chemical composition specified in Table 1. In the tension testing of magnesium alloy specimens, the rate of stressing up to the yield strength shall not exceed 100 ksi (700 MPa)/min. Exceedingly slow rates of testing may result in creep and hence are

TABLE X1.1 Die Casting and Other Characteristics

Alloy UNS	ASTM	Approximate Melting Range, °F (°C)	Resistance to Cold Defects[A]	Pressure Tightness	Resistance to Hot Cracking[B]	Machining[C]	Electroplating[D]	Surface Treatment[E]	Strength at Elevated Temperatures[F]
M10500	AM50A	1025–1145 (551–618)	3[G]	1[G]	2[G]	1[G]	2[G]	1[G]	3[G]
M10600	AM60A	1005–1140 (540–615)	3[G]	1[G]	2[G]	1[G]	2[G]	1[G]	3
M10410	AS41A	1050–1150 (565–620)	4[G]	1[G]	1[G]	1[G]	2[G]	1[G]	2
M10412	AS41B	1050–1150 (565–620)	4[G]	1[G]	1[G]	1[G]	2[G]	1[G]	2
M11910	AZ91A	875–1105 (470–595)	2	2	2	1	2	2	4
M11912	AZ91B	875–1105 (470–595)	2	2	2	1	2	2	4
M11916	AZ91D	875–1105 (470–595)	2	2	2	1	2	2	4
M10602	AM60B	1005–1140 (540–615)	3[G]	1[G]	2[G]	1[G]	2[G]	1[G]	3

[A] The ability of alloy to resist formation of cold defects; For example, cold shuts, cold cracks, non-fill "woody" areas, swirls, etc.
[B] Ability of alloy to withstand stresses from contraction while cooling through the hot-short or brittle temperature range.
[C] Composite rating based on ease of cutting, chip characteristics, quality of finish and tool life.
[D] Ability of the die casting to take and hold an electroplate applied by present standard methods.
[E] Ability of castings to be cleaned in standard pickle solutions and to be conditioned for best paint adhesion.
[F] Rating based on resistance to creep at elevated temperatures.
[G] Rating based upon limited experience, given guidance only.

TABLE X1.2 Typical Properties of Magnesium Alloy Die-Cast Test Specimens[D]

Property	Alloy UNS M10500 (AM50A)	Alloy UNS M10600 (AM60A[D]) and Alloy UNS M10602 (AM60B)	Alloy UNS M10410 and M10412 (AS41A) and (AS41B)	Alloys UNS M11910 M11912 and M11916 (AZ91A, AZ91B and AZ91D)
Tensile strength, ksi	29	32	31	34
(MPA)	(200)	(220)	(210)	(230)
Tensile yield strength, ksi	16	19	20	23
(MPa)	(110)	(130)	(140)	(160)
Compression yield strength, ksi	—	—	—	23
(MPa)	—	—	—	(160)
Elongation in 2 in. (50 mm), percent	10	8	6	3
Impact, ft-lb[A]	—	—	—	2
(J)	—	—	—	(3)
Shear strength[B], ksi	—	—	—	20
(MPa)	—	—	—	(140)
Fatigue strength[C], ksi	—	—	—	14
(MPa)	—	—	—	(100)
Brinell hardness	58	62	—	63
Rockwell hardness, F scale	—	—	—	75

[A] Unnotched.
[B] Double-shear tests converted to single-shear values.
[C] 5×10^8 cycles.
[D] ksi = 1000 psi. For explanation of SI unit MPa see Appendix X2.

to be avoided. Beyond the yield strength, the rate of straining shall not exceed 0.25 in./in.·min, measured on the gage length of the specimen. It should be thoroughly understood that the figures in the table represent die-cast test specimens and not specimens cut from commercial die-cast parts.

X1.3 Alloy AM60A has a specific gravity of about 1.78. It is suggested for use for those applications requiring a combination of good elongation, yield strength, and tensile strength.

X1.4 Alloy AS41A has a specific gravity of about 1.78. The alloy possesses good room temperature elongation, yield strength, and tensile strength. At temperatures up to about 350° F (175° C) it has a much increased creep resistance over Alloys AZ91A, AZ91B, and AM60A. Maximum resistance to creep is obtained at the lower aluminum content.

X1.5 Alloys AZ91A and AZ91B have a specific gravity of about 1.81. The copper and nickel contents in AZ91A should be kept low to minimize corrosion. The corrosion resistance of Alloy AZ91B is decreased by the higher copper content and die castings made from this alloy should be used under a known range of atmospheric conditions for which their life can be considered satisfactory.

X1.6 Alloys AZ910 and AS41B are high purity versions of AZ91A and AS41A. As a result they have high resistance to salt-water (NaCl) corrosion.

X2. METRIC EQUIVALENTS

X2.1 The SI unit for strength properties (MPa) is in accordance with the International System of Units (SI). The derived SI unit for force is the newton (N), which is defined as that force which when applied to a body having a mass of one kilogram gives it an acceleration of one metre per second squared ($N = kg \cdot m/s^2$). The derived SI unit for pressure or stress is the newton per square metre (N/m^2), which has been named the pascal (Pa) by the General Conference on Weights and Measures. Since 1 ksi = 6 894 757 Pa the metric equivalents are expressed as megapascal (MPa), which is same as MN/m^2 and N/mm^2.

SUMMARY OF CHANGES

This section identifies the location of changes to this standard that have been incorporated since the last issue.

(*1*) Alloy AM50A was added to Tables 1, X1.1, X1.2.

(*2*) An upper limit was added to the manganese specifications for alloys AM60A, AM60B, AZ91A, AZ91B, and AZ91D—Table 1.

(*3*) Compliance with regard to the minimum manganese limit and maximum iron limit was deferred to the critical iron manganese ratio for alloys AM60B and AZ91D in Table 1.

Outer Leg Die Casting 040900

Die Cast Production Specifications

To be used in consultation with your die caster (Use in combination with Checklist C-8-2)*

NADCA
C-8-1-94
Checklist

Checklist for Die Cast Production Part Purchasing

This Production Checklist provides a convenient method for assuring important factors involved in purchasing die cast parts are evaluated and clearly communicated between the purchaser and the die caster.

It should be used as a supplement to the essential dimensional and alloy specifications detailed on part prints submitted for quotation, since the listed factors directly affect the basis on which the die casting quotation is made. The checklist may be reproduced for this purpose. Your die caster will clarify any item requiring further explanation.

This checklist provides a numbering system in which the lowest numbered description for each requirement can be met at the lowest production cost, as follows:

No.	Cost Effect
☐ 1	Most economical basis for production
☐ 2	Involves additional work which may affect cost
☐ 3	Additional work and special requirements which increase cost

This checklist is for use in consultation with your die caster prior to estimating production costs. Use in combination with the Finishing Checklist C-8-2. Also review Checklists T-2-1A and T-2-1B, for Die Casting Die Construction, in Section 2.

A	**Surface Condition**	☐ 1 Some residue and chips not objectionable ☐ 2 Shop run—blown reasonably free of chips but not degreased ☒ 3 Clean, dry and free of chips	
B	**Cast Surface Finish**	☐ 1 Mechanical Quality—finish is not significant ☒ 2 Painting Quality—streaks and chill areas coverable with paint ☐ 3 Highest Quality—for electroplating, decorative finishing, O-ring seals	See NADCA Guideline G-6-6; Also check Item Q on Checklist C-8-2
C	**Flash Removal** Parting Line External Profile	☐ 1 No die trimming—break off gates and overflows ☒ 2 Die trimmed to within 0.010 in. (.25 mm) of die casting surface for Option A ☒ 3 Hand filed or polished—flush with die casting's surface for Option B	
D	**Flash Removal** Cored Holes	☒ 1 Flash not removed ☐ 2 Flash trimmed to within 0.010 in. (0.25 mm) of die casting surface ☐ 3 Flash to be machined	
E	**Flash Removal** Ejector Pins	☐ 1 Not removed (See NADCA Guideline G-6-5) ☐ 2 Crushed or flattened (See NADCA Guideline G-6-5) ☐ 3 Removed from specific locations	To Be Determined
F	**Pressure Tightness**	☒ 1 No requirement ☐ 2 Pressure-tight to agreed-upon psi (kPa). Testing medium: _____ ☐ 3 Other arrangements to be agreed upon	
G	**Flatness**	☒ 1 No requirement ☐ 2 To NADCA "Standard" specification tolerances (S-4-5) ☐ 3 Critical requirement—to NADCA "Precision" specification tolerances (P-4-5)	
H	**Dimensions**	☐ 1 Normal: per NADCA "Standard" specification tolerances ☒ 2 Semicritical: "Precision" tolerances on specified dimensions, others "Standard" ☐ 3 Critical: Must hold all specified dimensions to "Precision" tolerances	
I	**Customer's Receiving Inspection**	☐ 1 No unusual inspection requirements—no Statistical Quality Control ☒ 2 Statistical Quality Control: Acceptable at Cpk 1.33 or higher (or AQL over _____) ☐ 3 Statistical Quality Control: Acceptable at Cpk 2.0 or higher (or AQL over _____) (2 and 3 above: Require details of inspection procedure, with major and minor defects agreed upon)	
J	**Packaging**	☐ 1 Not critical—bulk packed ☒ 2 Layer packed, with separators, or weight restriction 50 lb. max package ☐ 3 Packed in cell-type separators or individually wrapped	
K	**Casting Insert**	☒ 1 No insert used in cast part ☐ 2 Inserts required, to be supplied by customer at 10% overage ☐ 3 Inserts required, to be supplied by die caster	

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*The specification provisions and procedures listed in Section 7, "Quality Assurance," subsections 3, 4 and 5, should also be addressed.

Outer Leg L - Casting 01070

Die Cast Surface Finishing Specifications

To be used in consultation with your Die Caster (Use in combination with Checklist C-8-1)*

NADCA
C-8-2-94
Checklist

Checklist for Finished Die Cast Part Purchasing

This Finishing Checklist provides a convenient method for assuring that important factors involved in the surface finishing of die cast parts are evaluated and clearly communicated between the purchaser and the die caster.

It should be used as a supplement to the essential dimensional and alloy specifications detailed on part prints submitted for quotation, since the listed factors directly affect the basis on which the die casting quotation is made. The checklist may be reproduced for this purpose. Your die caster will clarify any item requiring explanation.

This checklist provides a numbering system in which the lowest numbered description for each requirement can be met at the lowest production cost, as follows:

No.	Cost Effect
☐ 1	Most economical basis for production
☐ 2	Involves additional work which may affect cost
☐ 3-4	Additional work plus special requirements which increase cost
☐ 5	Most difficult surface to die cast on a production basis

This checklist is for use in consultation with your die caster prior to estimating production costs. Use in combination with the Finishing Checklist C-8-1. Also review Checklists T-2-1A and T-2-1B, for Die Casting Die Construction, in Section 2.

L	**Parting Lines**	☐ 1 Polishing not required ☐ 2 Polish only where marked on drawing ☐ 3 Polish all parting lines (except as noted)	Refer to C-8-1-94 Item C on this checklist
M	**Surface Preparation**	☐ 1 No buffing required ☐ 2 Mechanical (burnishing, tumbling, etc.) ☐ 3 Buff as indicated on drawing	Refer to C-8-1-94 Item C on this checklist
N	**Plating, Anodizing, or Other Special Finish** NA	☐ 1 Protective Only—Specify: _____ ☐ 2 Decorative—Specify: _____ ☐ 3 Severe Exposure Protection—Specify: _____	
O	**Painting** NA	☐ 1 Heavy Paint, Protective Only—Specify: _____ ☐ 2 Decorative Paint—Specify: _____ ☐ 3 Application requires base coat of special treatment: Specify: _____	
P	**Environmental Exposure**	☐ 1 Normal interior use only ☒ 2 Exposure to weather—Specify: Outdoor use in wet muddy to dry dusty ☐ 3 Exposure to unusual chemistry—Specify: _____	
Q	**As-Cast Surface** See NADCA Guideline G-6-6	☐ 1 Utility Grade—surface imperfections acceptable, nondecorative coatings ☐ 2 Functional Grade—slight, removable surface imperfections, heavier coatings ☒ 3 Commercial Grade—removable imperfections ☐ 4 Consumer Grade—no objectionable imperfections, as agreed upon, when viewed under normal lighting conditions at ____ feet viewing distance. ☐ 5 Superior Grade—specified average surface finish value of ____ microinches, per print.	
R	**Special Requirements** NA	For special flash removal requirements, see Checklist C-8-1, Items C & E For special packaging/weight restrictions, see Checklist C-8-1, Item J	

*The specification provisions and procedures listed in Section 7, "Quality Assurance," subsections 3, 4 and 5, should also be addressed.

Brake Arch, 040102

Die Cast Production Specifications

To be used in consultation with your die caster (Use in combination with Checklist C-8-2)*

NADCA
C-8-1-94
Checklist

Checklist for Die Cast Production Part Purchasing

This Production Checklist provides a convenient method for assuring important factors involved in purchasing die cast parts are evaluated and clearly communicated between the purchaser and the die caster.

It should be used as a supplement to the essential dimensional and alloy specifications detailed on part prints submitted for quotation, since the listed factors directly affect the basis on which the die casting quotation is made. The checklist may be reproduced for this purpose. Your die caster will clarify any item requiring further explanation.

This checklist provides a numbering system in which the lowest numbered description for each requirement can be met at the lowest production cost, as follows:

No.	Cost Effect
☐ 1	Most economical basis for production
☐ 2	Involves additional work which may affect cost
☐ 3	Additional work and special requirements which increase cost

This checklist is for use in consultation with your die caster prior to estimating production costs. Use in combination with the Finishing Checklist C-8-2. Also review Checklists T-2-1A and T-2-1B, for Die Casting Die Construction, in Section 2.

A	**Surface Condition**	☐ 1 Some residue and chips not objectionable ☐ 2 Shop run—blown reasonably free of chips but not degreased ☒ 3 Clean, dry and free of chips	
B	**Cast Surface Finish**	☐ 1 Mechanical Quality—finish is not significant ☒ 2 Painting Quality—streaks and chill areas coverable with paint ☐ 3 Highest Quality—for electroplating, decorative finishing, O-ring seats	See NADCA Guideline G-6-6; Also check item Q on Checklist C-8-2
C	**Flash Removal** Parting Line External Profile	☐ 1 No die trimming—break off gates and overflows ☒ 2 Die trimmed to within 0.010 in. (.25 mm) of die casting surface ☐ 3 Hand filed or polished—flush with die casting's surface	
D	**Flash Removal** Cored Holes	☒ 1 Flash not removed ☐ 2 Flash trimmed to within 0.010 in. (0.25 mm) of die casting surface ☐ 3 Flash to be machined	
E	**Flash Removal** Ejector Pins	☐ 1 Not removed (See NADCA Guideline G-6-5) ☐ 2 Crushed or flattened (See NADCA Guideline G-6-5) ☐ 3 Removed from specific locations	To Be Determined
F	**Pressure Tightness**	☒ 1 No requirement ☐ 2 Pressure-tight to agreed-upon psi (kPa). Testing medium: _____ ☐ 3 Other arrangements to be agreed upon	
G	**Flatness**	☒ 1 No requirement ☐ 2 To NADCA "Standard" specification tolerances (S-4-5) ☐ 3 Critical requirement—to NADCA "Precision" specification tolerances (P-4-5)	
H	**Dimensions**	☐ 1 Normal: per NADCA "Standard" specification tolerances ☒ 2 Semicritical: "Precision" tolerances on specified dimensions, others "Standard" ☐ 3 Critical: Must hold all specified dimensions to "Precision" tolerances	
I	**Customer's Receiving Inspection**	☐ 1 No unusual inspection requirements—no Statistical Quality Control ☑ 2 Statistical Quality Control: Acceptable at Cpk 1.33 or higher (or AQL over _____) ☐ 3 Statistical Quality Control: Acceptable at Cpk 2.0 or higher (or AQL over _____) (2 and 3 above: Require details of inspection procedure, with major and minor defects agreed upon)	
J	**Packaging**	☐ 1 Not critical—bulk packed ☒ 2 Layer packed, with separators, or weight restriction 50lb max package ☐ 3 Packed in cell-type separators or individually wrapped	
K	**Casting Insert**	☒ 1 No insert used in cast part ☐ 2 Inserts required, to be supplied by customer at 10% overage ☐ 3 Inserts required, to be supplied by die caster	

*The specification provisions and procedures listed in Section 7, "Quality Assurance," subsections 3, 4 and 5, should also be addressed.

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Brake Arch 070402

Die Cast Surface Finishing Specifications

To be used in consultation with your die caster (Use in combination with Checklist C-8-1)*

NADCA
C-8-2-94
Checklist

Checklist for Finished Die Cast Part Purchasing

This Finishing Checklist provides a convenient method for assuring that important factors involved in the surface finishing of die cast parts are evaluated and clearly communicated between the purchaser and the die caster.

It should be used as a supplement to the essential dimensional and alloy specifications detailed on part prints submitted for quotation, since the listed factors directly affect the basis on which the die casting quotation is made. The checklist may be reproduced for this purpose. Your die caster will clarify any item requiring explanation.

This checklist provides a numbering system in which the lowest numbered description for each requirement can be met at the lowest production cost, as follows:

No.	Cost Effect
☐ 1	Most economical basis for production
☐ 2	Involves additional work which may affect cost
☐ 3-4	Additional work plus special requirements which increase cost
☐ 5	Most difficult surface to die cast on a production basis

This checklist is for use in consultation with your die caster prior to estimating production costs. Use in combination with the Finishing Checklist C-8-1. Also review Checklists F-2-1A and F-2-1B, for die Casting Die Construction, in Section 2.

L Parting Lines
☐ 1 Polishing not required
☐ 2 Polish only where marked on drawing
☐ 3 Polish all parting lines (except as noted)
Refer to C-8-1-94 Item C this checklist

M Surface Preparation
☐ 1 No buffing required
☐ 2 Mechanical (burnishing, tumbling, etc.)
☐ 3 Buff as indicated on drawing
Refer to C-8-1-94 Item C this checklist

N Plating, Anodizing, or Other Special Finish NA
☐ 1 Protective Only—Specify: _____
☐ 2 Decorative—Specify: _____
☐ 3 Severe Exposure Protection—Specify: _____

O Painting
NA
☐ 1 Heavy Paint, Protective Only—Specify: _____
☐ 2 Decorative Paint—Specify: _____
☐ 3 Application requires base coat or special treatment:
Specify: _____

P Environmental Exposure
☐ 1 Normal interior use only
☒ 2 Exposure to weather—Specify: Outdoor use in wet muddy to dry dusty
☐ 3 Exposure to unusual chemistry—Specify: _____

Q As-Cast Surface
See NADCA Guideline G-6-6
☐ 1 Utility Grade—surface imperfections acceptable, nondecorative coatings
☐ 2 Functional Grade—slight, removable surface imperfections, heavier coatings
☒ 3 Commercial Grade—removable imperfections
☐ 4 Consumer Grade—no objectionable imperfections, as agreed upon, when viewed under normal lighting conditions at ____ feet viewing distance.
☐ 5 Superior Grade—specified average surface finish value of ____ microinches, per print.

R Special Requirements NA
For special flash removal requirements, see Checklist C-8-1, Items C & E
For special packaging/weight restrictions, see Checklist C-8-1, Item J

*The specification provisions and procedures listed in Section 7, "Quality Assurance," subsections 3, 4 and 5, should also be addressed.

12A

POTENTIAL
FAILURE MODE AND EFFECTS ANALYSIS
(PROCESS FMEA)

FMEA Number 0006

m 040900/040904/040908 | Process Responsibility ANSWER Project Team | Page 1 of 3

lel Year(s)/Vehicle(s) Right/Left Outer Legs & Arch | Key Date | Prepared By Scott D. Shope

ce Team Mike Bellmer, Scott Shope, Marty Zoerner | FMEA Date (Orig.) 11-06-95 (Rev.) 11-15-95

												ACTION RESULTS				
:ocess inction .equirements	Potential Failure Mode	Potential Effect(s) of Failure	Sev	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occur	Current Process Controls	Dtec	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	Sev	Occ	Det	RPN
. Melt Metal Ingot d Hold Molten tal at Required mperature	•Material Fails to Meet Spec.	Casting Failure (Breaks)	10		Material Quality: Metal Supplier	1	Supp. Cert. w/Data Incoming Inspection SPECTROLAB Metal Analyzer In-house	2	20							
					Metal Handling Procedure Not Followed	1	Personnel Training, Metal Analysis Performed Twice a Shift Per Furnace	2	20							
	•Heat Cracks in Casting	Casting Failure (Breaks)	10		Metal Temperature too High	2	Digital Temperature Control w/Alarm. Charted Hourly by Technician. X-ray 1 Casting Twice per shift (Excluding X-Ray P/N: 040905) Visual Audit Twice per Shift, Ac=0, Re=1	2	40							
	•Nonfill Condition in Casting	Casting Failure (Breaks)	10		Metal Temperature too Cold	2	Digital Temperature Control w/Alarm. Charted Hourly by Technician. Visual Audit Twice per Shift, Ac=0, Re=1	2	40							
. Ladle Metal From rnace to Diecast achine.	•Nonfill Condition in Casting	Casting Failure (Breaks)	10		Not Enough Metal Ladled	4	Nicolet Process Monitoring of Biscuit Length. Personnel Training/ Instructions	1	40							
	•Contaminated Metal in Casting (Dirty Metal)	Casting Failure (Breaks)	10		No Back Ladling Prior to Ladle Fill	1	Personnel Training/Process Instructions. Visual Audit Twice per Shift, Ac=0, Re=1	3	30							
					Metal Handling Procedures not Followed.	2	Personnel Training/Process Instructions.	2	40							

POTENTIAL
FAILURE MODE AND EFFECTS ANALYSIS
(PROCESS FMEA)

Item 040900/040904/040908 | Process Responsibility ANSWER Project Team | FMEA Number 0006

Model Year(s)/Vehicle(s) Right/Left Outer Legs & Arch | Key Date | Page 2 of 3

Core Team Mike Bellmer, Scott Shope, Marty Zoerner | Prepared By Scott D. Shope

FMEA Date (Orig.) 11-05-95 (Rev.) 11-15-95

												ACTION RESULTS				
Process Function / Requirements	Potential Failure Mode	Potential Effect(s) of Failure	Sev	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occur	Current Process Controls	Detec	RPN	Recommended Action(s)	Responsibility & Target Completion Date	Actions Taken	Sev	Occ	Det	RPN
30. Diecast Machine Process, Injects Molten Metal into Mold and Freezes Metal to Produce Casting	•Porosity -- Partingline Holes	Casting Failure (Appearance)	4		Diecast Machine Parameters out of Optimum Operating Range: •Improper Slow Approach Length •Improper Slow Approach Speed •Improper Fast Shot Speed •Improper Shot Pressure •Improper Shot Time •Improper Dwell Time •Improper Clamp Pressure	4	Digital Process Monitoring System. Diecast Technician Hourly Process Verification. X-Ray 1 Casting Twice Per Shift. (Excluding X-Ray P/N: 0-40908) Visual Audit Twice per Shift. Ac=0. Re=1	3	48							
	•Blister	Cause Interference at Assembly.	4		Improper Die Temperature	3	Diecast Technician Hourly Process Verification	3	21							
					Too Much Die Lubrication •Mix Too Rich •Spray Time Too Long	4	Diecast Technician Hourly Process Verification. Visual Audit Twice per Shift. Ac=0. Re=1	2	32							
	•Shrinks/Voids & Internal Porosity	Casting Failure (Breaks)	10		Diecast Machine Parameters out of Optimum Operating Range: •Improper Slow Approach Length •Improper Slow Approach Speed •Improper Fast Shot Speed •Improper Shot Pressure •Improper Shot Time •Improper Dwell Time •Improper Clamp Pressure	3	Digital Process Monitoring System. Diecast Technician Hourly Process Verification. X-Ray 1 Casting Twice Per Shift. (Excluding X-Ray P/N: 0-40908) Visual Audit Twice per Shift. Ac=0. Re=1	2	60	X-Ray 2 Shots per hour to verify Casting Integrity until process matures. NOTE: Excluding P/N: 0-40908	Mike Bellmer 8-14-95	9-14-95	10	3	1	30
	•Chill/Swirls	Casting Failure (Appearance)	4		Diecast Machine Parameters out of Optimum Operating Range: •Improper Slow Approach Length •Improper Slow Approach Speed •Improper Fast Shot Speed •Improper Shot Pressure •Improper Shot Time •Improper Dwell Time •Improper Clamp Pressure	5	Digital Process monitoring System. Diecast Technician Hourly Process Verification. Visual Audit Twice Per Shift. Ac=0. Re=1	2	40							

POTENTIAL
FAILURE MODE AND EFFECTS ANALYSIS
(PROCESS FMEA)

FMEA Number 0006

em 040900/040904/040908 Process Responsibility ANSWER Project Team Page 3 of 3

del Year(s)/Vehicle(s) Right/Left Outer Legs & Arch Key Date Prepared By Scott D. Shope

re Team Mike Bellmer, Scott Shope, Marty Zoerner FMEA Date (Orig.) 11-05-95 (Rev.) 11-15-96

rocess unction Requirements	Potential Failure Mode	Potential Effect(s) of Failure	Sev	Class	Potential Cause(s)/ Mechanism(s) of Failure	Occur	Current Process Controls	Detec	RPN	Recommended Action(s)	Responsibility & Target Completion Date	ACTION RESULTS: Actions Taken	Sev	Occ	Det	RPN
. Diecast Machine ocess, Injects olten Metal into old and Process tal to Produce sting			4		Improper Die Temperature	4	Diecast Technician Hourly Process Verification	3	48							
					Too Much Die Lubrication •Mix Too Rich •Spray Time Too Long	4	Diecast Technician Hourly Process Verification.	2	32							
. Extract Parts om Diecast Machine d Located on Trim. im Process Removes cess Material From sting	Bent Casting	Won't Fit Trim.	6		Operator Hits Parts and/or Pushes Parts Against Other Objects/Equipment	3	Personnel Training/Process Instructions. Trim Die Nest helps to identify bent parts.	1	18							
		Casting Failure (Assembly)	6		Part Not Located in Trim Properly	3	Personnel Training/Process Instruction Process Setup Verification	1	18							
	Rough Edges/Excess Material	Assembly Interference	4		Dull or Damaged Cutters on Trim Die.	4	Tool Maintenance Program	3	48							
. Sanding Process move Excess terial From rtingLine.	Rough Edges/ PartingLines	Casting Failure (Appearance)	4		Sanding Process Instructions not properly followed.	3	Personnel Training. Descriptive Process Instructions	3	36							
. Vibratory Deburr d Corrosion hibitor Treatment	Rough Edges	Casting Failure	4		Low Media Volume	4	Personnel Training Descriptive Process Instructions	2	32							
	Corrosion Possible Due to long term storage, prior to painting	Poor Paint Adhesion (Appearance)	3		Incorrect Ratio of Corrosion Inhibitor (Appearance)	2	Automatic Metering equipment maintains proper ratio	5	30							
. Rinse and Dry	Dirty Parts	Poor Paint Adhesion (Appearance)	3		Rinse Water Insufficient	2	Personnel Training	5	30							

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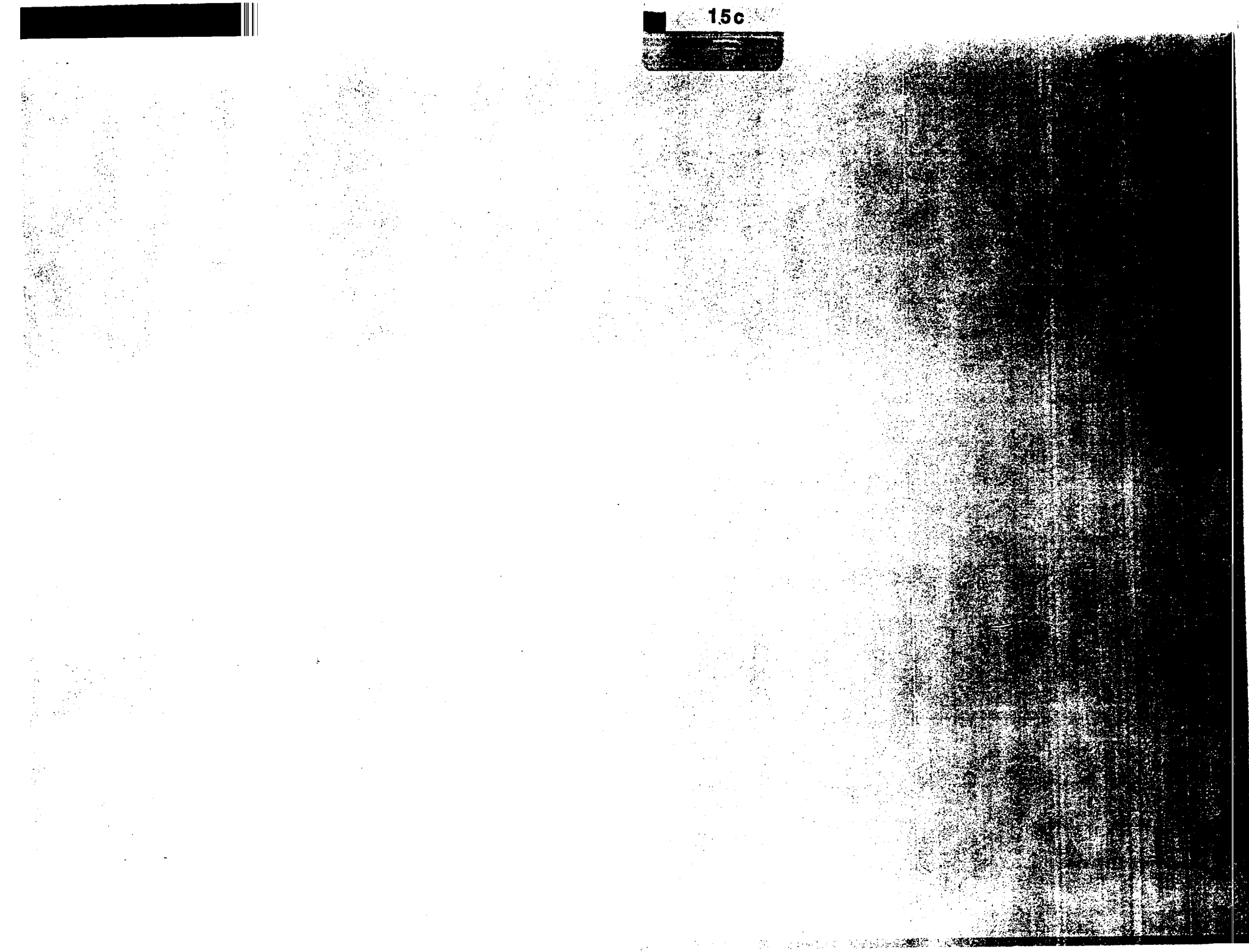
E: Primary RPN's of 50 or Greater require the following:

a) Recommended actions
b) Responsibility and targeted completion dates
c) Results of action taken including the secondary RPN


15c

15c. The identity of the person (s) who identified the potential problem, the date he/she identified the problem, any persons they notified, and the date of notification.

A combination of warranty returns and customer complaints identified the problem. See enclosed warranty return summary .

MACH 5 DROPOUT FAILURE DATA SHEET

DATE	RA#	FORK TYPE	FORK SERIAL #	RIGHT DATE	LEFT DATE	BUILD DATE		
10/16/95	130627	SX	5100051366	*	*	9/15/95		
10/23/95	131679	SX	5100051289	8	7	9/15/95		
10/24/95	131920	COMP	5100042716	*	*	8/30/95		
10/31/95	133016	SX	5100051310	8	7	9/15/95		
11/2/95	133290	SX	5100074657	*	*	10/13/95		
?	?	COMP	5100034677	*	7	8/11/95		
?	?	PRO	5100053622	*	*	9/15/95		
12/7/95	135736	SX	5100074670	6	6	10/13/95		
12/7/95	135738	SX	5100048564	7	7	9/8/95		
12/15/95	137860	SX	5100080577	6	7	10/17/95		
12/18/95	139556	SX	5100090053	*	*	11/2/95		
12/28/95	137573	SX	5100075233	*	*	10/13/95		
1/24/96	140419	SX	5100085890	**	**			
1/26/96	141563	SX	5100075102	**	**	10/13/95		
2/1/96	143316	COMP	5100028965	**	**	7/21/95		
2/1/96	143774	SX	5100075002	8	7	10/13/95		
2/1/96	?	SX	5100083592	8	7	10/23/95		
2/8/96	145897	SX	5100065410	8***	7	11/13/95		
2/8/96	145946	COMP	5100043916	8***	7	8/30/95		
2/13/96	146444	SX	5100065701	8	7	9/28/95		
2/13/96	?	SX	5100097690	**	**	11/10/95		
2/14/96	146104	SX	?	**	**			
2/19/96	147212	SX	5100052138	8	7	9/15/95		
2/20/96	143271	SX	5100074441	**	**	10/13/95		
2/20/96			5100065135	8	7	9/28/95		
2/22/96	148084	COMP	5100119261	**	**	12/15/95		
2/23/96	146274	SX	5100075222	8	7	10/13/95		
2/26/96	146907	PRO	5100091470	9	7	10/30/95		
2/26/96	147357	SX	5100099905	9	*	11/13/95		
2/28/96	147535	SX	5100052314	*	*	9/15/95		
2/29/96	148342	SX	5100130583	9	9	1/19/96		
3/4/96			5100072245	8	7	10/9/95		
3/8/96			5100089511	9	7	11/2/95		
3/11/96			5100074438	8	7	10/13/95		
	143697	PRO	?	**	**			
	142204	SX	?	**	**			
	143509	SX	?	**	**			
	?		5100121268	*	9	12/19/95		
3/29/96	?	COMP	5100059235	8	7	9/22/95	These forks	
3/29/96	?	COMP	5100109046	8	7	11/20/95	were returned	
3/29/96	?	SX	?	8	7		from	
3/29/96	?	SX	?	8	7		vendors	
3/29/96	?	COMP	5100073165	8	7	10/6/95	who	
3/29/96	?	PRO	5100078760	8	7***	10/13/95	have held	
3/29/96	?	PRO	5100079277	*	*	10/13/95	them	
3/29/96	?	SX	5100090116	*	*	11/2/95	until	
3/29/96	?	SX	5100060513	*	*	9/27/95	recently.	
3/29/96	?	SX	5100089448	8	9	11/2/95	Returned	
3/29/96	?	SX	5100063321	8***	7	9/26/95	through sales	
3/29/96	?	SX	5100049247	8	7	9/13/95	not warranty.	

Note:

* Fork has been seen, dropout(s) not available.

** Fork has not been seen, outer legs not yet dated.

*** This dropout not broken

15d. Concerning the information specified by 16 C.F.R. 1115.13 (d) (6), please include a copy of all safety related consumer or dealer complaints, warranty claims, reports of injury, and copies of all documents related to such complaints, claims and injuries. Please include, copies of all court complaints and related documents filed in or associated with lawsuits involving the product and a description of the resolution of those lawsuits, if any.

See enclosures Consumer Complaints

Answer Products, Inc. • 27460 Ave. Scott • Valencia, CA 91355 USA • (805) 257-4411 FAX (805) 257-4011

SOLD TO
040312 TED'S BICYCLES
3016 N. HANCOCK
COLORADO SPRING CO 80907

SHIP TO
040312 TED'S BICYCLES
3016 N. HANCOCK
ATTN: TONY
COLORADO SPRING CO 80907

SHIPPED VIA	SALESMAN	INVOICE NO.	INVOICE DATE	CUSTOMER NO.	PAGE NUMBER
UPS BLUE	911	0139314	12-19-95	040312	1

#CTNS.	CUSTOMER P.O.#	OUR ORD.#	ORD. DATE	F.O.B.	TERMS
1	RA # 139905	139905-00	12-19-95	PPD	NET 30

QTY. ORD.	QTY. SHIP	B.O.	ANSWER PART. NO.	CUSTOMER PART NO.	DESCRIPTION	UNIT PRICE	AMOUNT
1	1		85-6446		MANITOU SX, 1 1/8 ALLOY THDLSS		
			N/C RETURN & REPLACE - OK PER KEITH GOLDMAN				
			SEE RA # 139910				
			WARRANTY / MARC RUFFNER				
			** FOR RETAIL CUSTOMER STEVE CLARK **				
			MUST SHIP TODAY				
			UPS BLUE LABEL				
					Sub Total		

INVOICE COPY

THANKS,

MARC R.

NO RETURNED GOODS WITHOUT OUR CONSENT.
- *REFER TO "TERMS AND CONDITIONS" IN OUR CATALOG.*
- *NO CREDITS ISSUED WITHOUT INVOICE NUMBER AND DATE.*
- *ALL SHORTAGES MUST BE REPORTED WITHIN 3 DAYS OF RECEIPT OF SHIPMENT.*
- *A LATE CHARGE OF 2% PER MONTH (24% PER ANNUM)*

~~SUBTOTAL~~
~~SALES TAX~~
~~SHIPPING & HANDLING~~

TOTAL

Jeff Ziegler
31 Highland St.
Co. Sprgs., Co. 80906
(719) 634-5301

Dear Mr. Goldman

I appreciate your immediate response regarding the incident with my Mach 5 SX fork. Due to the crash there were a number of items that were damaged (some of which Answer has already replaced). I was unable to perform my job resulting in one week of unexcused non-pay absence. Below is a list of items that were damaged. I've also enclosed a repair bill from Criterium Bike shop.

1. Giro supermoto helmet $139.90 ✓
2. Pearl Izumi clima guard jacket $149.99
3. Pearl Izumi ultrasensor tight $74.99
4. Pearl Izumi ultrasensor short $74.99
5. Pearl Izumi pittards therma fleece gloves $39.99
6. Vetta C-500 wireless computer $59.99
7. One week lost wages $700.00
8. Criterium Bike shop repair bill $251.96

   Total damage = $1491.81

Sincerely,

Jeff Ziegler

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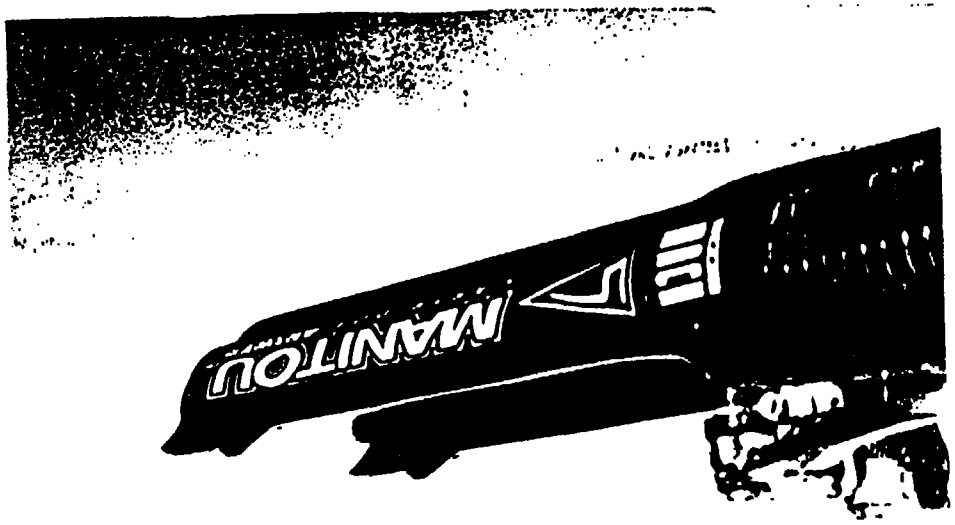

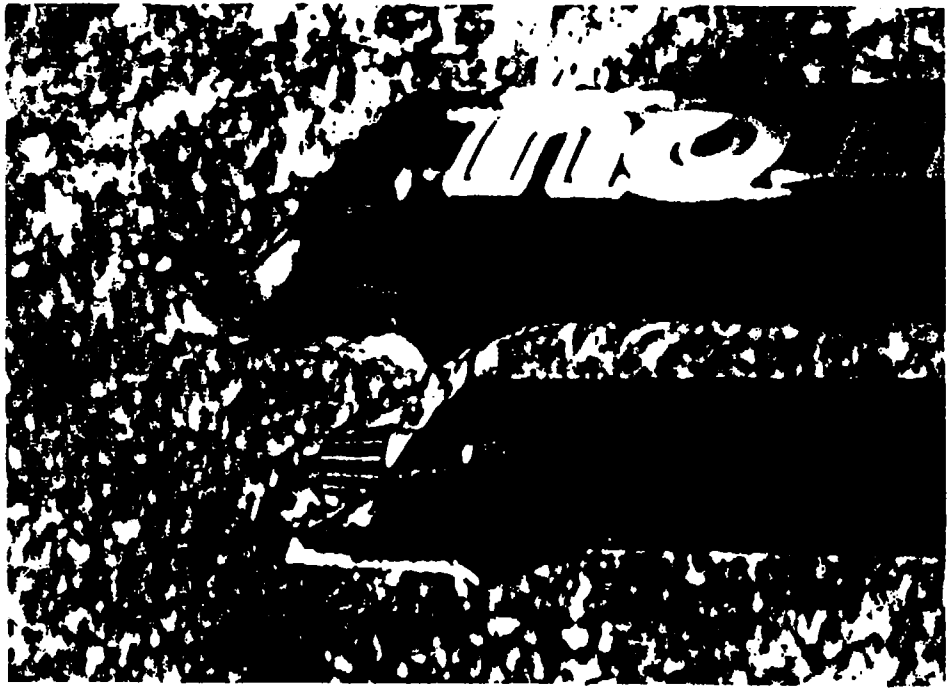

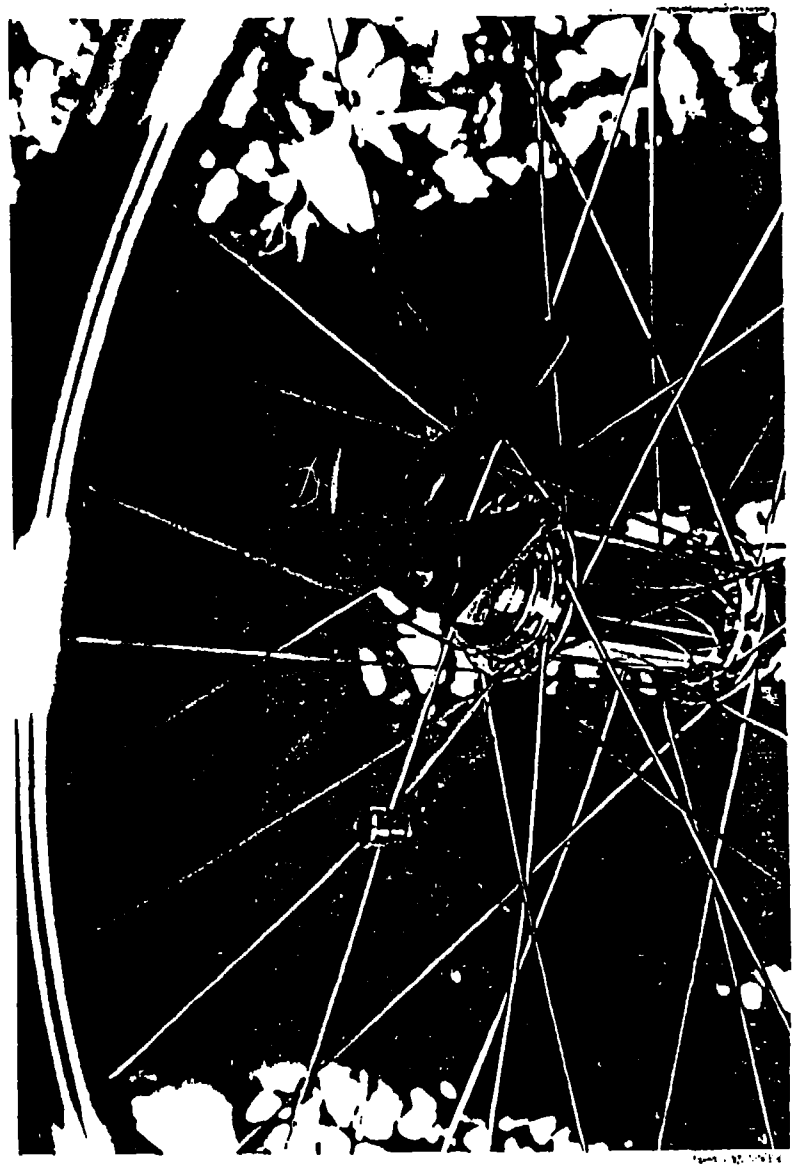

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CRITERIUM BIKE SHOPS, INC.

DOWNTOWN
326 N. TEJON
(719) 475-0149

NORTHEAST
6660 N. ACADEMY
(719) 599-0149

TEST RIDE OUR STORE!

NAME JEFF ZEIGLER
STREET 318 HIGHLAND ST.
CITY COS STATE CO ZIP 80906
HOME PHONE 634-5591 WORK PHONE 598-0808

UNITS
MECHANIC

219529
CHECKED IN ON STORAGE HOOK #
DONE REPAIR ON STORAGE HOOK #
CUSTOMER

SERVICE/PARTS DESCRIPTION	JOB CODE OR PART #	UNITS	LABOR ESTIMATE	PARTS ESTIMATE	LABOR CHARGES	PARTS CHARGES
Install: Tube F R Tire F R						
Wheels: True F R Replace F R Rebuild F R						
Brakes: Adjust F R Install F R						
Derailleurs: Adjust F R Install F R						
Hubs: Adjust F R O'Haul F R						
Headset/Bottom Bracket: Adjust Hdst/BB O'Haul Hdst/BB						
Bike Tune-Up: Basic Major Brake System Only						
Bike Overhaul: Basic Major Drive Train Only						
New Bike Free Check Up Repair Warranty						
ESTIMATE						
Rebuild FRONT WHEEL			25 00			
MAVIC 217 SUP,				55 00		
15-16 W/ALLOY NIPPLES BLACK			~~25 00~~	21 00		
NIPPLES				8 50		
Replace front V-Brake			INC	69 95		
Install Lefty tube			4 00	15 00		
Install NEW FORK (HIS)			43 00			
SAVE OLD PARTS ☐ CALL WHEN COMPLETED ☐	UNIT TOTAL		PARTS ESTIMATE	169 45	PARTS TOTAL	
			LABOR ESTIMATE	~~93~~ 00	LABOR TOTAL	
			SUBTOTAL		SUBTOTAL	
			TAX ESTIMATE	10 51	TAX	
			ESTIMATE	25196	TOTAL	

DIAGNOSIS / WARNINGS: THE FOLLOWING ITEMS WERE FOUND TO BE UNSAFE OR MAKE THIS BIKE UNRIDEABLE. IMMEDIATE REPAIR IS RECOMMENDED.

WAITING FOR JEFF TO BRING IN FORK

I HAVE READ THE AT STATEMENT AND DEC INE TO HAVE THE RECOMMENDED WORK DONE AT THIS TI

SIGNATURE DATE

STORAGE FEES OF $ ____ A DAY COMMENCE ____ DAYS AFTER PROMISED COMPLETION TIME.

NOT RESPONSIBLE FOR GOODS LEFT OVER 30 DAYS

AUTHORIZED BY: DATE

REPAIR IDENTIFICATION

BRAND/MODEL MAVIC
SERIAL NUMBER FS

BIKE TYPE
CIRCLE ONE OR MORE

RACING ATB/MTB JUVENILE UNICYCLE TRACK
TOURING BMX TRICYCLE RECUMBENT FT. WHEEL
RECREATIO FREESTYLE TANDEM CROSS/HYB RR. WHEEL
MENS WOMENS 27 26 24 20
OTHER:

COLOR
CIRCLE ONE OR MORE

BLACK BLUE BROWN CAMO. CHROME
GOLD GREEN GRAY ORANGE PINK
PURPLE RED SILVER WHITE YELLOW
OTHER: POLISHED

ACCESSORIES
CIRCLE IF PRESENT/CROSS-OFF IF ABSENT

LOCK PUMP H₂O BOT
LIGHTS BAGS COMPUT
SEAT COVER NUMBER PLATE PADS
OTHER:

WHEEL REPAIRS
CIRCLE IF PRESENT/CROSS-OFF IF ABSENT

TIRE AND TUBE FREEWHEEL
Q.R. SKEWER(S) AXLE NUTS(
REFLECTOR(S) WHEEL COV
COMPUTER MAGNET VALVE CAP
OTHER:

NOT TO GO OVER ____
EST. BY DAVE
MECH. ____
INSPECT. BY ____

PROMISED COMPLETION TIME

MONTH ____

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28				31

SUN	MON	TU.	.D	THU	FRI

Answer Products, Inc. • 27460 Ave. Scott • Valencia, CA 91355 USA • (805) 257-4411 FAX (805) 257-4011

SOLD TO 039001
WARRANTY REPAIR CYCLING
BE SURE TO OVERIDE BOTH SHIP TO AND SOLD TO ADDRESSES.
WATCH YOUR TAX CODE F6
. CA

SHIP TO 039001
JEFF ZIEGLER
31 HIGHLAND ST.
COLORADO SPRINGS CO 80906

SHIPPED VIA	SALESMAN	INVOICE NO.	INVOICE DATE	CUSTOMER NO.	PAGE NUMBER
UPS RED	980		00-00-00	039001	1

#CTNS.	CUSTOMER P.O.#	OUR ORD.#	ORD. DATE	F.O.B.	TERMS
9	JEFF ZIEGLER	140810-00	12-27-95	PPD	COD-CHK OK

QTY. ORD.	QTY. SHIP	B.O.	ANSWER PART. NO.	CUSTOMER PART NO.	DESCRIPTION	UNIT PRICE	AMOUNT
1	1		85-6458		SX 96, LEG ASSY, NO CABLE HANGER	81.17	
1	1		85-3586		MACH5 CROWN/STEER, 1 1/4 ALTHDL	23.57	
1	1		03-8004		BLACK HYPERLITE BAR 3 DEG	14.37	
1	1		85-8603		ROCKER SEAT POST 31.6MM CLR	25.80	
1	1		85-3349		FS & DH 96 FIRM RIDE KIT	17.62	
1	1		041008		REAR SHOCK NUT FS96	1.20	
1	1		041089		REBOUND SPACER, FS&DH96 REAR	.85	
2	2		77-7000		MANITOU I.D. HAT BLACK	7.50	
		UPS RED LABEL					172.03
		MUST SHIP TODAY					1650.00
		MUST SHIP TODAY					1822.03
		MUST SHIP TODAY					
					Sub Total		

- NO RETURNED GOODS WITHOUT OUR CONSENT.
- REFER TO "TERMS AND CONDITIONS" IN OUR CATALOG.
- NO CREDITS ISSUED WITHOUT INVOICE NUMBER AND DATE.
- ALL SHORTAGES MUST BE REPORTED WITHIN 3 DAYS OF RECEIPT OF SHIPMENT.
- A LATE CHARGE OF 2% PER MONTH (21% PER ANNUM)

~~SUBTOTAL~~
~~SALES TAX~~
~~SHIPPING & HANDLING~~

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SETTLEMENT AND RELEASE AGREEMENT

THIS RELEASE AGREEMENT is entered into on January 25, 1996, by and between JEFF ZIEGLER (Ziegler) and ANSWER PRODUCTS, INC. ("Answer"), with respect to the following facts:

A. Ziegler alleges that he was injured while using a product manufactured and distributed by Answer. Answer denies any liability for Ziegler's injuries.

B. It is the desire of Ziegler and Answer to fully and finally terminate all relationships, controversies, claims and other matters whatsoever existing or which may hereafter arise between Ziegler on the one hand and Answer on the other hand in connection with the matters described in Recital A, subject only to the terms and conditions set forth in this Agreement.

NOW THEREFORE the parties agree as follows:

1. INCORPORATION OF RECITALS. The foregoing recitals are incorporated herein by reference as if at this point set forth in full.

2. SETTLEMENT PAYMENT. In settlement of Ziegler's claims against Answer, Answer agrees to pay Ziegler ONE THOUSAND SIX HUNDRED FIFTY DOLLARS AND ZERO CENTS ($1,650.00) plus replacement parts already supplied to Ziegler. Answer's payment of this compensation is not an admission of any liability on the part of Answer for Ziegler's injuries.

3. RELEASE. Pursuant to Section 1541 of the California Civil Code, Ziegler releases and forever discharges Answer, its respective assigns, transferees, directors, officers, employees, servants, successors, attorneys, agents, and representatives of and from any and all claims, demands, damages, debts, liabilities, actions,. causes of action, suits, contracts, controversies, agreements, accounts, reckonings, obligations and judgments, whether in law or equity which Ziegler now has, owns or holds or at any time hereafter or heretofore ever had, owned or held, or could, shall or may hereafter have, own or hold, for which the respective assigns, transferees, directors, officers, employees, servants, successors, attorneys, agents or representatives hereafter can, shall or may have, based upon, related to or by reason of any contract (express, implied in fact, implied in law or otherwise), liens, liability, law matter, cause, fact, thing, act or omission whatever occurring or existing at any time whatever heretofore and to and including the date hereof, including without limiting the generality of the foregoing, any claim or liability for or on account of any and all matters which are or might have been the subject matters which are or might have been referred to or in any way involved with the facts incorporated by reference in Paragraph 1 hereof. Excluded from this release are Answer's obligations under this Agreement.

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4. INTENTION OF ZIEGLER. It is the intention of Ziegler in executing this Agreement that it shall be effective as a full and final accord and satisfactory release of each and every matter herein specifically or generally referred to. In furtherance of this intention, Ziegler acknowledges that he is familiar with Section 1542 of the Civil Code of the State of California, which provides as follows:

> A general release does not extend to claims which a creditor does not know or suspect to exist in his favor at the time of executing the release, which if known by him must have materially affected his settlement with the debtor.

Ziegler hereto waives and relinquishes any rights and benefits which Ziegler has or may have under Section 1542 of the Civil Code of the State of California to the full extent that Ziegler may lawfully waive all such rights and benefits pertaining to the subject matter of this Agreement. Ziegler acknowledges that he is aware that he may hereafter discover facts in addition to or different from those which he now knows or believes to be true with respect to the subject matter of this Agreement, but it is Ziegler's intention hereby to fully and finally forever settle and release any and all matters, disputes and differences, known and unknown, suspected and unsuspected, which do now exist, may exist or heretofore have existed between Ziegler on the one hand and Answer on the other hand, and that in furtherance of this intention, the releases herein given shall be and remain in effect as full and complete general releases not withstanding discovery or existence of any such additional or different facts.

5. REPRESENTATIONS BY ZIEGLER. Ziegler warrants and represents to Answer that Ziegler has not heretofore assigned or transferred or purported to assign or transfer to any person other than Answer, any matter or any part or portion thereof covered by this Agreement and Ziegler agrees to indemnify or hold harmless Answer from and against any claim, demand, damage, debt, liability, account, reckoning, obligation, cost, expense, lien, action or cause of action (including attorneys' fees and costs paid or incurred) based upon or in connection with or arising out of any such assignment or transfer or purported or claimed assignment or transfer.

6. NO ADMISSION. The execution of this Agreement affects the settlement of claims which are contested and denied. Nothing herein contained shall be construed as an admission by Answer of any liability of any kind to Ziegler. Ziegler acknowledges that Answer expressly denies that it is in any way liable or obligated to Ziegler.

7. ENTIRE AGREEMENT. This Agreement contains the entire understanding of the parties; there are no representations, covenants or undertakings other than those expressly set forth herein. Ziegler and Answer acknowledge that no other party or any agent or attorney of any other party has made any promise,

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representation or warning whatever, expressed or implied or statutory, not contained herein, concerning the subject matter hereof, to induce them to execute this Agreement, and they acknowledged that they have not executed this Agreement in reliance on any such promise, representation or warranty, not specifically contained herein.

8. BINDING ON SUCCESSORS. This Agreement and the covenants and conditions herein contained shall apply to, be binding upon and inure to the benefit of the respective heirs, administrators, executors, legal representatives, assigns, successors and agents of Ziegler and Answer.

9. SEVERABILITY. The provisions of this instrument are severable and should any provision be for any reason unenforceable, the balance shall nonetheless be of full force and effect.

10. CONSTRUCTION. This Agreement shall in all respects be interpreted, enforced and governed by and under the laws of the State of California. This Agreement is to be deemed to have been jointly prepared by Ziegler and Answer, and any uncertainty or ambiguity existing herein shall not. be interpreted against Ziegler or Answer by reason of Civil Code Section 1654, but according to the application of the other rules of interpretation of contracts, if any such uncertainty or ambiguity exists.

11. ATTORNEYS' FEES. In the event that Ziegler or Answer shall institute any action or proceeding to enforce any rights granted hereunder the prevailing party in such action or proceeding shall be entitled, in addition to any other relief granted by the court or other applicable judicial body, to such reasonable attorneys' fees as may be awarded.

IN WITNESS WHEREOF Ziegler and Answer execute this Agreement on the date first above written.

JEFF ZIEGLER

ANSWER PRODUCTS, INC.

By:_____
KEITH GOLDMAN, V.P. FINANCE

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15e. Provide two samples of the product, including retail packaging and instructions for assembly and use. Also provide a sample of the "fix", if such has been made, with instructions to be given to consumers. If there is a cost associated with these samples, notify us prior to sending the samples

1.) See enclosed copies of the Owners Manual. Samples of castings and/or forks assembled with castings produced prior to October and after October are available upon requests. Casting process and tooling refinements that bring the dropout strength to acceptable levels appear in Section 10.

2.) Additional enhancements were accomplished by revising the window areas of the dropout. Samples of castings and/or forks with modification are also available upon request.

MANITOU

POSI-LINK ANSWER

COMP & PRO XC

MACH 5

SERVICE MANUAL

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ANSWER PRODUCTS INC. VALENCIA, CA 91355
PHONE 805 257-4411 FAX 805 257-4011

15f. A copy of the firm's catalog depicting the product.

95 / 96 Catalog Enclosed

ANSWER

1996 MOUNTAINBIKE ACCESSORY CATALOG

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Voluntary Corrective Action Plans Under Section 15
of the Consumer Product Safety Act and
Section 15 of the Federal Hazardous Substances Act

The following is a list of voluntary corrective action plans recently accepted by the Commission (or the staff acting under authority delegated by the Commission). A firm's taking corrective action does not constitute admission by the firm that a substantial product hazard exists.

Space does not permit the staff to give a complete list of the specific model numbers of the products involved in each of these corrective actions. Consumers who believe that they have a product affected by one of these actions should follow the instructions given in this list or contact either the manufacturer or the Commission to determine if their product is one of those affected.

Firm Name: Answer Products Inc.
File Number: RP960123
Product: Mt Bike suspension fork

CORRECTIVE ACTION PLAN:

A. Notice:

Event:	Date:
_x_press release	April 1996
_x__direct mail (100% dealers/distributors)	March 15, 1996
_x__point of purchase signs	March 15, 1996
_x__paid advertising *[in Velo News, Bike Retailer, Mt. Bike - magazines]*	April 1996
__x_other ANSWER PRODUCTS staff will handout and supply in event packets information and bulletins on the recall	March 8, 1996

B. Repair, replacement, refund:

_x__repair approved by technical support

_x__replacement with product approved by technical support

C. Procedures:

__x_Distribution chain recall
_x__mfr/importer level
_x__wholesaler/distributor level
__x_retailer level
_x__consumer level

_x__Return to retailer

_x__Toll-free line 800-423-0273

_x__Other: An Answer Products equipment and repair van will do repairs and replacements free at all mountain bike events starting on March 8, 1996.

Firm Name: Answer Products Inc.
File Number: RP960123

D. Effectiveness: 69,000 total manufactured with possible defect

Number corrected at manufacturer 50,000

Number corrected at distributor

Number corrected at retailer

Number corrected at consumer 350

E. Decision on corrective action:

__x_Accept CAP and Monitor

___Accept CAP and Close File

___Pursue further remedial action

CAP APPROVALS:

Compliance Officer_____
Jay DeMarco
Asst Director, CECA_____
C. Downs
AEDCE_____
(Only if CAP or CAP & Close approval)
[capf.wp5]

Attorney_____
M. Gidding

Voluntary Corrective Action Plans Under Section 15 of the Consumer Product Safety Act and Section 15 of the Federal Hazardous Substances Act

DATE	FIRM AND PRODUCT	ALLEGED HAZARD	REMEDY
00/00	Answer Products Inc. Valencia, CA 91355 Manitou,Mach 5 suspension frok	Rider could fall from bike if fork failed.	Firm notifed all end users, dealers and distributors via mail and postable bulletins. Firm did repairs at major mountain bike events and a joint press release as well as paid ads in industry journals.

CORRECTIVE ACTION PLAN PROGRESS REPORT

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For Period Ending: _____

Case # : RP960123 CO: James DeMarco Company Name: Answer Products Inc.
Product: Mt Bike suspension fork Total Affected: _____

1) **PRODUCTS CORRECTED**

Location of Products	Total Products	Corrections This Period	Total Corrections	%Corrected
With Manufacturer				
With Distributor				
With Retailers				
With Consumers				
Total				

2) **CONSUMER AWARENESS OF PROGRAM**

Type of Notification	This Reporting Period	Total
Bill Stuffer		
Direct Mail Letter		
Magazine		
Newspaper		
Other/Unknown		
Pediatrician Poster		
Phone Call		
Product Catalog		
Radio		
Retail Store Poster		
TV		
VNR		

3) **Calls to 800 Number/Correspondence**

	This Reporting Period	Total
800 Number		
Written Requests		

Note: Submit completed form by the 1st of each month to Tina Adeyeye at
U.S. Consumer Product Safety Commission, Office of Compliance
4330 East West Highway, Room 613
Bethesda, MD 20814
OR, fax to (301)504-0359. If you have any questions, please call Tina at (301)504-0608, ext 1223

Firm Name: Answer Products Inc.
File Number: RP960123
Product: Mt Bike suspension fork

CORRECTIVE ACTION PLAN:

A. Notice:

Event:	Date:
_x_press release	April 1996
_x__direct mail (100% dealers/distributors)	March 15, 1996
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_x__paid advertising *[in Velo News, Bike Retailer, Mt. Bike - magazines]*	April 1996
__x_other ANSWER PRODUCTS staff will handout and supply in event packets information and bulletins on the recall	March 8, 1996

B. Repair, replacement, refund:

_x__repair approved by technical support

_x__replacement with product approved by technical support

C. Procedures:

__x_Distribution chain recall
_x__mfr/importer level
_x__wholesaler/distributor level
__x_retailer level
_x__consumer level

_x__Return to retailer

_x__Toll-free line 800-423-0273

_x__Other: An Answer Products equipment and repair van will do repairs and replacements free at all mountain bike events starting on March 8, 1996.

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Firm Name: Answer Products Inc.
File Number: RP960123

D. Effectiveness: 69,000 total manufactured with possible defect

Number corrected at manufacturer 50,000

Number corrected at distributor

Number corrected at retailer

Number corrected at consumer 350

E. Decision on corrective action:

__x_Accept CAP and Monitor

___Accept CAP and Close File

___Pursue further remedial action

CAP APPROVALS:

Compliance Officer_____
Jay DeMarco
Asst Director, CECA_____
C. Downs
AEDCE_____
(Only if CAP or CAP & Close approval)
[capf.wp5]

Attorney_____
M. Gidding

Voluntary Corrective Action Plans Under Section 15 of the Consumer Product Safety Act and Section 15 of the Federal Hazardous Substances Act

DATE	FIRM AND PRODUCT	ALLEGED HAZARD	REMEDY
00/00	Answer Products Inc. Valencia, CA 91355 Manitou,Mach 5 suspension frok	Rider could fall from bike if fork failed.	Firm notifed all end users, dealers and distributors via mail and postable bulletins. Firm did repairs at major mountain bike events and a joint press release as well as paid ads in industry journals.

Firm Name: Answer Products Inc.
File Number: RP960123
Product Name:Mt Bike suspension fork

FILE CLOSING

A. Number distributed: 0

Numbers corrected:
manufacturer/importer level 20000
distributor/wholesaler level 0
retailer level 0
consumer level 0

___Status reports evaluated
___Request for close received from firm
___Distribution checks completed
___Retail checks completed
___Consumer checks completed

B. Distributor/Retailer Effectiveness Checks

	Dist.	Retailer
Effectiveness Inspections Conducted	_____	_____
Telephone Checks Conducted	_____	_____
Firms in Full Compliance	_____	_____
Firms Notified but taking Insufficient Action	_____	_____
Firms not Notified	_____	_____

C. Consumer Effectiveness Checks

Telephone Checks Conducted	_____
Notified and Taking Sufficient Action	_____
Notified but not Taking Sufficient Action	_____
Not Notified	_____

Decision:

___Close file
___Seek further corrective action
___Continue to monitor

Rationale:

CLOSE APPROVALS:

Compliance officer_____ Attorney_____
Director, CACA_____
AED,CA_____
(Only if Close approval)

cc. Regional office
ATTACHMENT: PROGRESS REPORT

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ANSWER

ANSWER PRODUCTS, INC. 27460 Ave. Scott Valencia, CA 91355
Phone (805) 257-4411 FAX (805) 257-4011

FAX SHEET

COMPANY: CPSC Office of Compliance

ATTENTION: Mr. James A. DeMarco

FROM: Scott Boyer S. Boyer

DATE: 3/20/96 PAGE 1 of 3

10,000
dealerships
250 @ upgrade
100 @ upgrade

Dear James,

Please review our proposed Dealer and Consumer recall notices. We await your review and approval.

– where –
– # w/ Consumers?
– made of?
– Incentive.

$50,000
$10,000 fixed

– PR joint to follow next couple weeks

– Ads Velo Mt Bike & Bike Retailer.
3 issues

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RP96-123

March 15, 1996

Mr. James DeMarco
Division of Corrective Actions
Office of Compliance
Consumer Product Safety Commission
Washington, D.C. 20207

By Telecopier (Fax)
3/15/96

Re: Initial Report About Answer Products, Inc. Mach 5 Suspension Forks for Mountain Bicycles

Dear Mr. DeMarco:

This letter's purpose is to make an initial report to the Consumer Product Safety Commission ("CPSC") about one of our products, the Mach 5 suspension fork. After reviewing the CPSC's regulations set forth in the Code of Federal Regulations, we are not convinced Answer Products is required to make this initial report since we do not believe the Mach 5 suspension fork contains a substantial defect which could create a substantial product hazard within the meaning of section 15(b) of the Consumer Product Safety Act or creates an unreasonable risk of serious injury or death. That said, Answer Products believes in public safety and wishes to comply fully with any applicable regulations which conceivably could mandate a report to the CPSC. In making our analysis regarding an initial report, we have resolved all doubts about any reporting obligation in favor of making a report.

This initial report is about the suspension fork castings on a limited number of Mach 5 suspension forks at the fork's dropout area. The suspension fork is used on Mountain bicycles and is the part of the bicycle which holds the front wheel in place. The suspension fork connects the wheel to the bicycle's handlebar and frame. The "dropout area" is the lower part of the suspension fork. We have received several reports indicating that a small percentage of the Mach 5 suspension fork castings can fail under certain circumstances, possibly leading to the separation of the front wheel from the fork during use.

Approximately 1,000 to 4,000 of the approximately 69,799 suspension forks manufactured between June 5, 1995 and September 1, 1995 could have the problem discussed above.

ANSWER PRODUCTS, INC.
28209 AVE. STANFORD, VALENCIA, CA 91355
805-257-4411 FAX: 805-294-4181

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Our address is: Answer Products, Inc., 28209 Avenue Stanford, Valencia, California 91355. Answer Products, Inc., is the assembler and distributor of the Mach 5 suspension fork.

We want to emphasize that Answer Products believes in the quality of its products as well as safety. The company will stand behind all of its products and is ready to take all reasonable steps necessary to remedy this situation in the unlikely event a customer finds this situation with his or her Mach 5 suspension fork. We stress that we make this initial report out of a genuine desire to comply fully with all applicable federal regulations. If necessary, we will follow up with a more detailed report as required under the CPSC's regulations. We would welcome the opportunity to discuss this matter with a member of the CPSC's staff.

Sincerely,

Keith Kolman for Edward Cole

Edward Cole
President, Answer Products, Inc.

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U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, DC 20207

OFFICE OF COMPLIANCE

DIVISION OF
CORRECTIVE ACTIONS
Tel: 301-504-0608
FAX: 301-504-0359

_____CONFIRMATION COPY TO FOLLOW BY U.S. MAIL
_____FAX TRANSMISSION ONLY

DATE: 3/19/96 PAGES TRANSMITTED 2 + cover

TO: Eddie Cale / Scott Boyer

TITLE: _____

OFFICE: Answer Products

FAX #: 805-294-4173

FROM: J. DEMARCO

REMARKS: Call w/ Ques.!!

Can we jointly draft something

Like this!

NOTE: If all pages are not received, or if you have problems with this transmittal, please contact the person listed above.

161

ANSWER PRODUCTS, INC. 27460 Ave. Scott Valencia, CA 91355
Phone (805) 257 - 4411 FAX (805) 257-4011

FAX SHEET

COMPANY: CPSC Office of Compliance FAX (301) 504-0359

ATTENTION: Mr. James A. DeMarco

FROM: Scott Boyer

DATE: 4/11/96 PAGE 1 of 3

Dear James,

I have revised the joint Press Release with the information you requested. A copy follows. We feel it is now ready to go.

Best Regards,

S. Boyer

Scott Boyer

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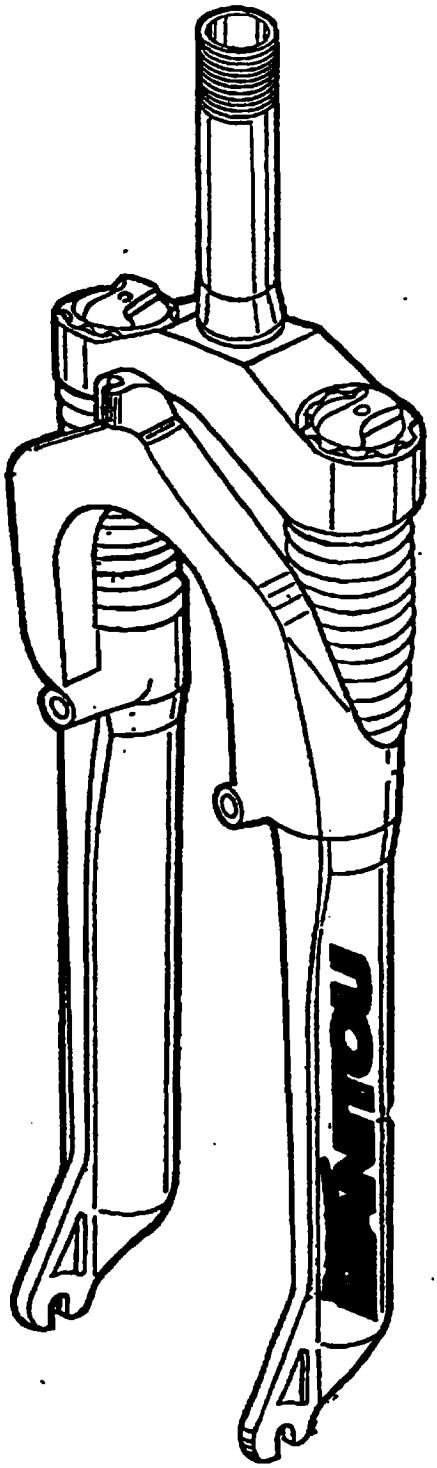


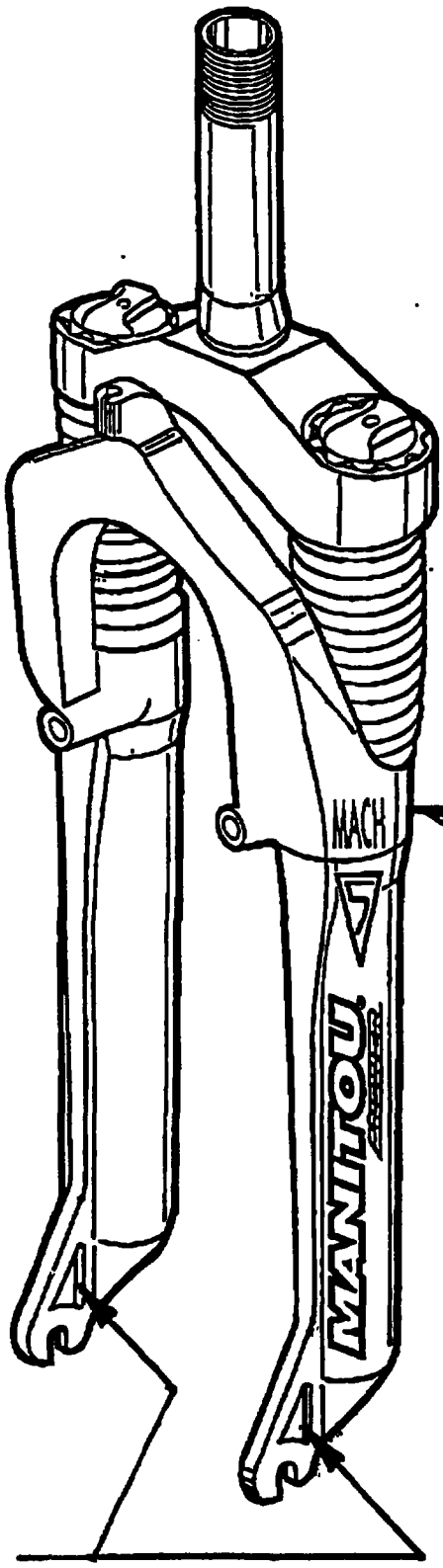
Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

To S. DE MARCO | From S. GRAVES

Co. CPSC | Co. AMER

Dept. COMPLIANCE | Phone #

Fax # (301) 504-0359



SERIAL NUMBER
BACK OF LOWER LEG

BREAKAGE(S)
OCCUR HERE

U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, D.C. 20207

OFFICE OF COMPLIANCE
AND ENFORCEMENT

Division of
Corrective Actions
Tel: 301-504-0608 Ext. 1353
Fax: 301-504-0359

DATE:	April 10, 1996	PAGES TRANSMITTED:	4 + cover
TO:	Scott Boyer		
TITLE:	Answer Products Inc.		
OFFICE:	805-257-4011		

FROM: James A. DeMarco, Compliance Officer, CCA, HQ

REMARKS: CAN YOU PLEASE FILL IN THE BLANKS AND EXPAND ON INJURIES ETC. OR CLAIMS. ALSO IS LINE DRAWING ACCURATE? ASAP PLEASE! Thanks.

NOTE: If you have any problems with this transmittal, please contact the person listed above.

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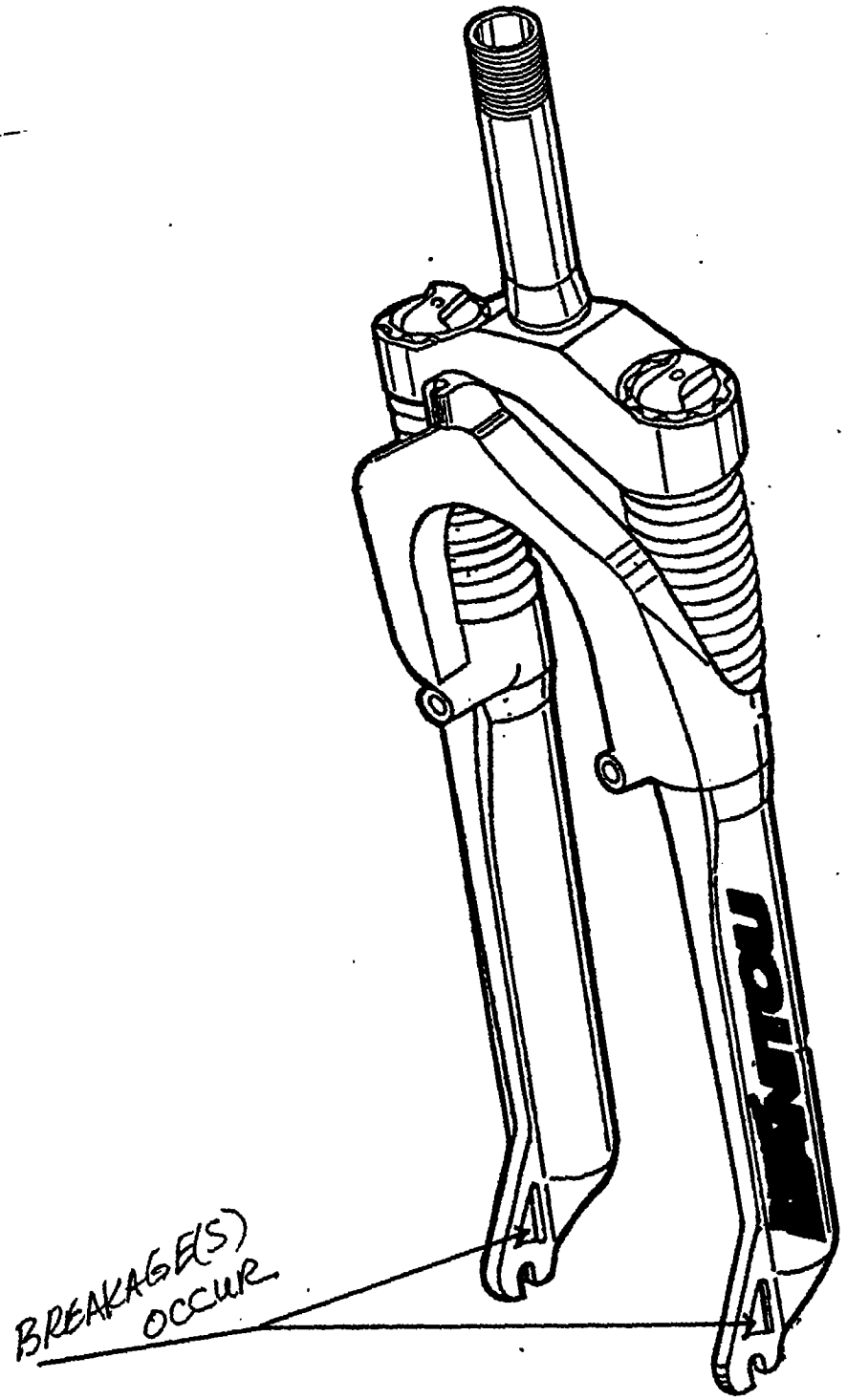
BREAKAGE(S)
OCCUR

****
*** ACTIVITY REPORT ***
****

TRANSMISSION OK

TX/RX NO.	0354
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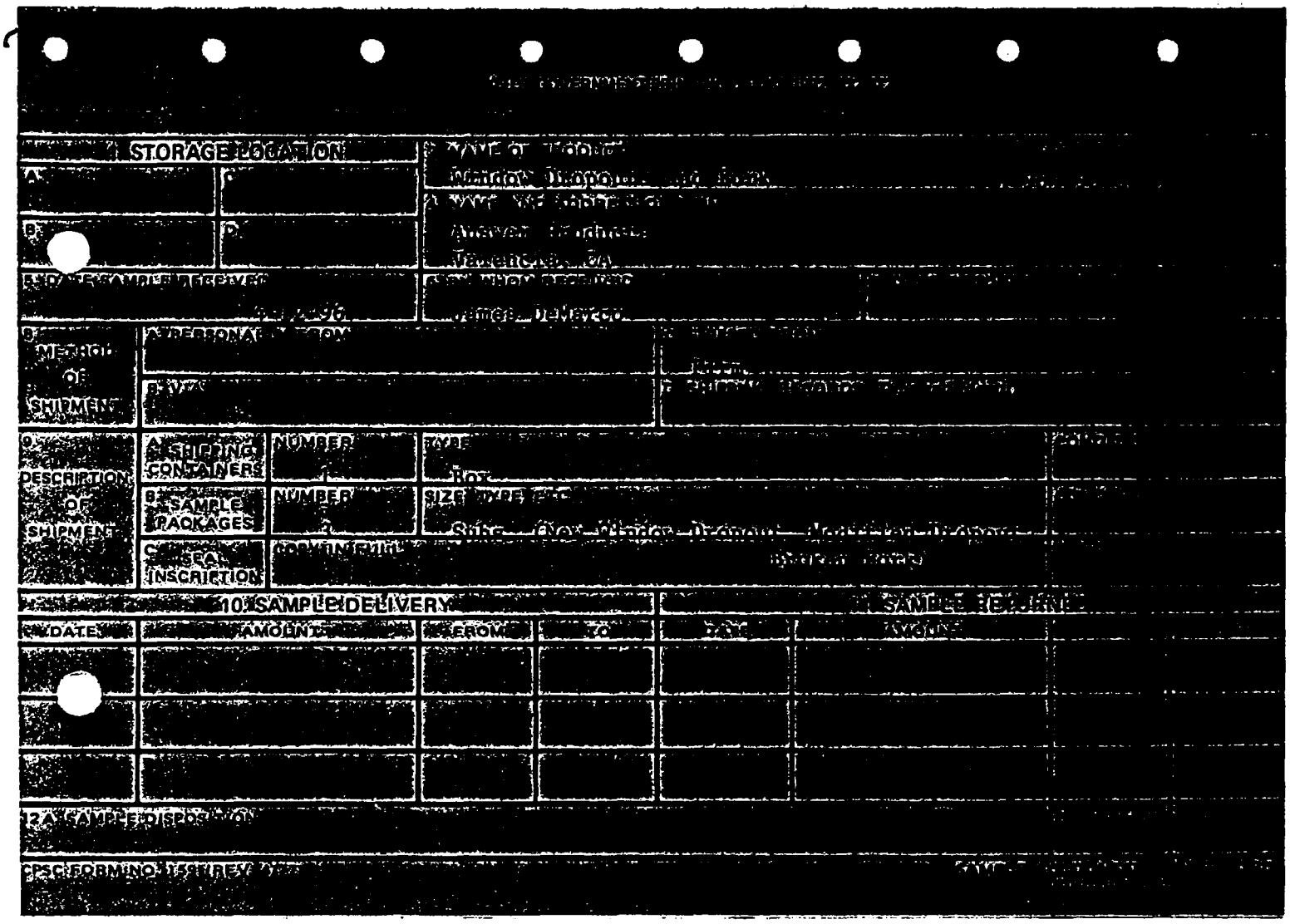
CONNECTION ID	
START TIME	04/10 12:00
USAGE TIME	04'01
PAGES	8
RESULT	OK



7. STORAGE LOCATION		8. TYPE OF PACKAGE
A.	B.	Mailing Envelope
C.	D.	Other (Specify)
9. DATE SAMPLE DELIVERED		10. HOW SHIPPED
Oct 1996		Hand Delivered

11. METHOD OF SHIPMENT	A. PERSONAL DELIVERY	B. DATE
	C.	D.

12. DESCRIPTION OF SHIPMENT	A. SHIPPING CONTAINERS	NUMBER	TYPE
	B. SAMPLE PACKAGES	NUMBER	SIZE
	C. SEAL INSCRIPTION	CONTAINERS	

13. SAMPLE DELIVERY				14. SAMPLE RETURN	
DATE	AMOUNT	FROM	TO	DATE	AMOUNT

15. SAMPLE DISPOSAL

16. PERFORMING SURVEY

ANSWER

28209 AVENUE STANFORD • VALENCIA, CA 91355
805 • 257 • 4411 FAX: 805 • 294 • 4181

PACKING LIST

SOLD TO:
GENERIC RETAIL ONLY
CA

SHIP TO:

ORDER #	DATE	CUSTOMER P.O. NO.	DATE REQUIRED	SHIP VIA	TERMS	F.O.B.	PAGE
							1 OF

DESCRIPTION	PART #	QTY PACKED	QTY PICKED	QTY ORDERED	QTY SHIPPED	QTY B.O.	UNIT PRICE	AMOUNT
NEW WINDOW DROPOUT								
MODIFIED DROPOUT								
BROKEN FORK								
GIVE THIS TICKET TO PAUL JOHNSON								

- NO RETURNED GOODS WITHOUT THE CONSENT OF ANSWER PRODUCTS.
- REFER TO "TERMS AND CONDITIONS" IN OUR CATALOG.
- NO CREDITS ISSUED WITHOUT INVOICE # AND DATE.
- ALL SHORTAGES MUST BE REPORTED WITHIN 3 DAYS OF RECEIPT OF SHIPMENT.
- A LATE CHARGE OF 2% PER MONTH (24% PER ANNUM) WILL BE CHARGED ON ALL PAST DUE BALANCES.

914 [illegible] REPLACEMENTS

U.S. CONSUMER PRODUCT SAFETY COMMISSION
SAMPLE COLLECTION REPORT

1. Flag	*2. Date Collected*		*3. Sample type & number* [ ] *Physical* [ ] *Documentary*
4a. Product Name	*4b. Model*	*4c. NEISS*	*5. Assignment Ref.*
6. Complete for Import Samples *a. Port of Entry :* *b. Entry # & Date:* *c. Country of Origin:* *d. HSUSA Code :* *e. Customs Contact :*		*7. MIS* *9a. Home RO*	*8. Hours:* *a. Activity [ ]* *b. Travel [ ]* *9b. Collecting RO*
10. Sample Cost	*11. Invoice Value of Lot*		*12. Size of Lot*
13. Manufacturer/Importer *ID #*	*14. Shipper/Foreign Mfr.* *ID #*		*15. Dealer/Import Broker* *ID #*

16. Supporting documents attached:
- *a. Invoice # & Date:*
- *b. Date Shipped:*
- *c. Shipping Record # & Date:*
- *d. Affidavit Signer's Name, Title & Date:*

17. Product Identification:

18. Reason for Collection & Analysis Needed: *FHSA* [ ] *CPSA* [ ] *FFA* [ ] *PPPA* [ ] *RSA* [ ]

19. Summary of Field Screening:

20. Sample Size, Method of Collection:

21. Identification on Sample:		*22. Identification on Seal:*
23a. Sample Delivered To:	*23b. Date*	*24. Orig. Report/Records Sent To:*

25. Laboratory/Office: *ESEL* [ ] *HSHL* [ ] *HSPS* [ ] *CERM* [ ] *CECA* [ ] *OTHER* [ ]

26. Remarks:

27. Related Samples:

28a. Collector's Name, Title & Employee #	*28b. Collector's Signature & Date*
29a. Reviewer's Name, Title & Employee #	*29b. Reviewer's Signature & Date*

Distribution: *Original* [ ] *Lab* [ ] *Fiscal* [ ] *Data* [ ] *Hdqtr* [ ] *Other* [ ]

CPSC Form 166 (Rev. 9/91) (Adapted for WP Windows & HP Laserjet III 9/93)

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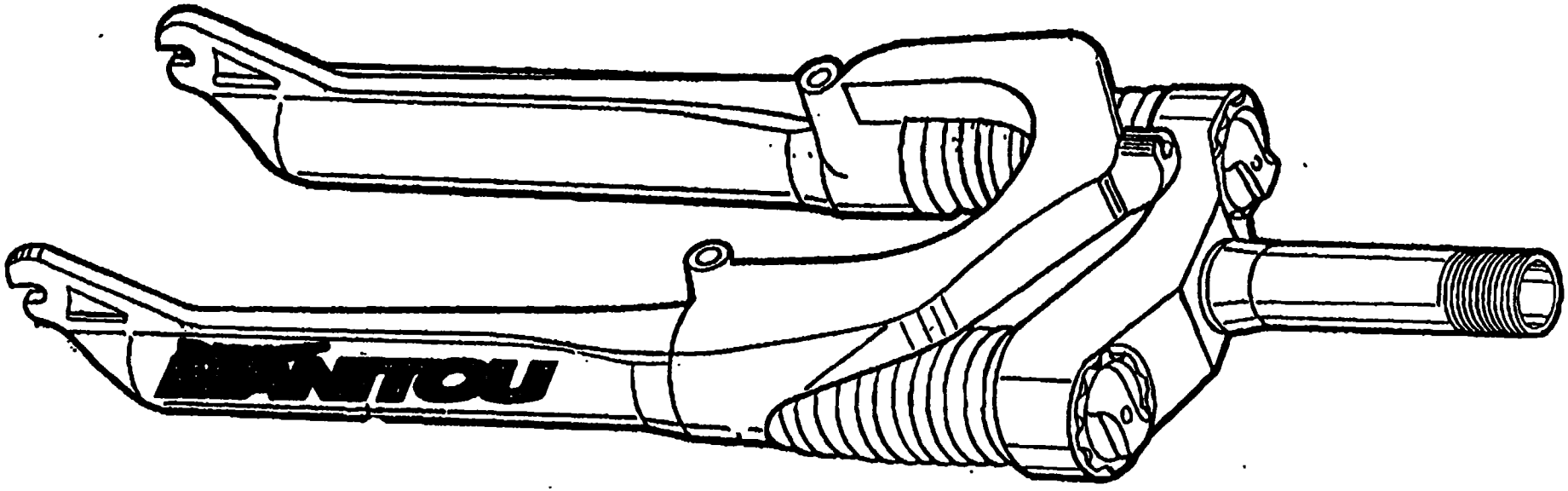
Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

To S. DEMARCO	From S. BOYER
Co. CPSC	Co.
Dept.	Phone #
Fax # (301) 504 0559	Fax #



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IMPORTANT SAFETY NOTICE

MANITOU MACH5 SUSPENSION FORKS

Answer has found that a small percentage of the Mach 5 fork die cast leg assemblies may fail under certain circumstances. This situation would result in loss of control of the bicycle. Therefore, we are requesting all of the subject forks be inspected.

If you own a Mach 5 fork you should:

1. STOP USING THE FORK IMMEDIATELY UNTIL THE FORK CAN BE INSPECTED.

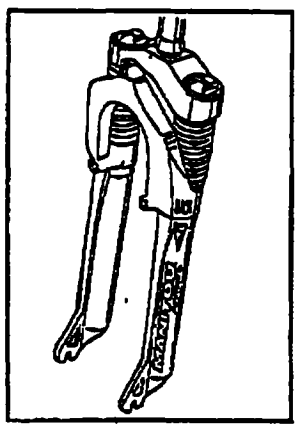
2. Forks with Serial Numbers LESS than # 5100086500 need to have the leg castings replaced .

3. Forks with Serial Numbers GREATER than # 5100086500 yet LESS than # 5100149464 need to be returned for Inspection.

4. Forks with Serial Numbers LESS than # 5100149464, BUT have a Red paint dot on the inside of the drop out, have been inspected and are not subject to this notice

5. Forks with Serial Numbers GREATER than 5100149464 are not subject to this notice.

6. Call Answer for a Return Authorization and shipping information **(800) 670-7446**



Answer Products Incorporated
28209 Avenue Scott, Valencia CA 91355
(805) 257-4411 Fax (805) 294-4181
(800) 670-7446

Velo News and Bicycle Industry Retailer

Velo News #7:
Velo News #8:
Velo News #9:

Bicycle Retailer #7:
Bicycle Retailer #8:
Bicycle Retailer #9:

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Firm Name: Answer Products Inc.
File Number: RP960123
Product: Mt Bike suspension fork

CORRECTIVE ACTION PLAN:

A. Notice:

Event:	Date:
_x_press release	April 1996
_x__direct mail (100% dealers/distributors)	March 15, 1996
_x__point of purchase signs	March 15, 1996
_x__paid advertising *[in Velo News, Bike Retailer, Mt. Bike - magazines]*	April 1996
__x_other ANSWER PRODUCTS staff will handout and supply in event packets information and bulletins on the recall	March 8, 1996

B. Repair, replacement, refund:

_x__repair approved by technical support

_x__replacement with product approved by technical support

C. Procedures:

__x_Distribution chain recall
_x__mfr/importer level
_x__wholesaler/distributor level
__x_retailer level
_x__consumer level

_x__Return to retailer

_x__Toll-free line 800-423-0273

_x__Other: An Answer Products equipment and repair van will do repairs and replacements free at all mountain bike events starting on March 8, 1996.

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Firm Name: Answer Products Inc.
File Number: RP960123

D. Effectiveness: 69,000 total manufactured with possible defect

Number corrected at manufacturer 50,000

Number corrected at distributor

Number corrected at retailer

Number corrected at consumer 350

E. Decision on corrective action:

__x_Accept CAP and Monitor

___Accept CAP and Close File

___Pursue further remedial action

CAP APPROVALS:

Compliance Officer 3/27/96
Jay DeMarco

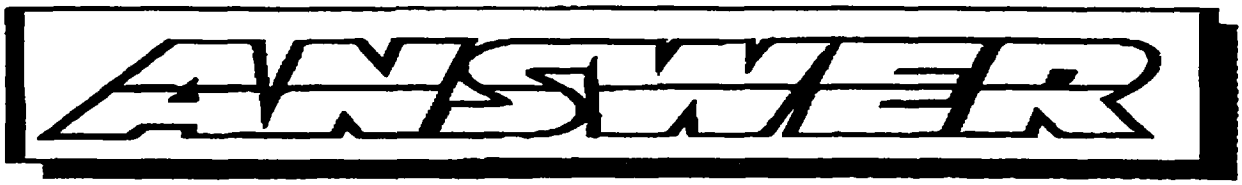
Attorney_____
M. Gidding

Asst Director, CECA Cathy Downs 3-28-96
C. Downs

AEDCE 3/28/96
(Only if CAP or CAP & Close approval)

[capf.wp5]

174



ANSWER PRODUCTS, INC. 27460 Ave. Scott Valencia, CA 91355
Phone (805) 257 - 4411 FAX (805) 257-4011

FAX SHEET

COMPANY:	**CPSC Office of Compliance**	**(301) 504-0608**
ATTENTION:	**Mr. James A. DeMarco**	
FROM:	**Eddie Cole**	
DATE:	**3/21/96**	**PAGE 1 of 3**

Dear James,

Please review our revised Dealer and Consumer recall notices per our conversation today. Please call me if they are approved.

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IMPORTANT SAFETY NOTICE

DEALERS, PLEASE READ IMMEDIATELY

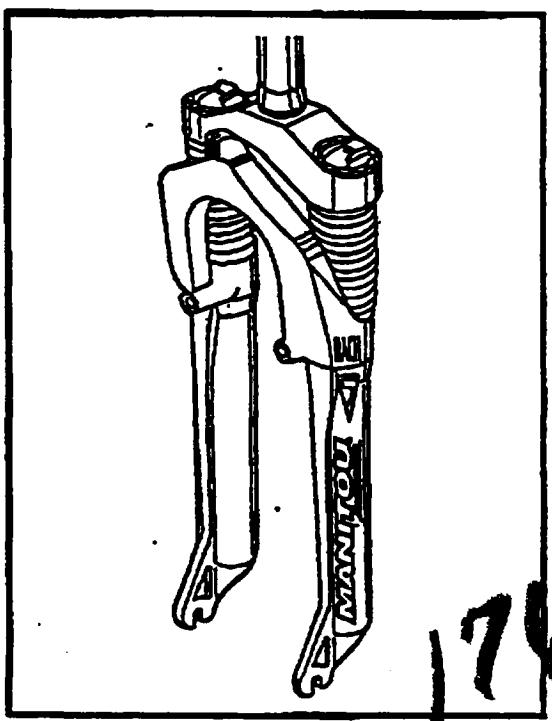
Re: 1995-96 Answer Manitou Mach 5 SX Mountain Bike Suspension Forks
1995-96 Answer Manitou Mach 5 Pro Mountain Bike Suspension Forks
1995-96 Answer Manitou Mach 5 Comp Mountain Bike Suspension Forks

Dear Answer Retailer,

Answer Products has found that a small percentage of the 1995-96 season Manitou Mach 5 fork die cast leg assemblies may fail under certain circumstances. Although the percentage of forks that have castings which could fail under some circumstances is very small, the casting failure may cause the front wheel to separate from the bicycle. This situation would result in loss of control of the bicycle. Therefore, we are requesting all of the subject forks be inspected by our Dealers.

We request that you please:

1. Notify all known purchasers and owners to STOP USING THE MANITOU MACH 5 FORKS IMMEDIATELY UNTIL THE SERIAL NUMBER CAN BE INSPECTED and the appropriate action indicated below is taken.
2. STOP SALES OF ALL NEW MACH 5 FORKS in your inventory until the serial numbers of the Mach 5 forks in stock, or on bicycles can be inspected and appropriate action per this notice is taken.
3. All Mach 5 forks with Serial Numbers LESS than Ser. # 5100086500 need to have the outer leg castings replaced before riding . The casting replacement will be done at no charge.
4. Forks that have Serial Numbers that are GREATER than Ser. # 5100086500 yet LESS than Ser.# 5100149464 need to be returned to be inspected here at Answer Products and reworked if necessary. This will be done at no charge.
5. All Mach 5 forks with a number LESS than # 5100149464, BUT have a Red paint dot on the inside of the drop out, have already been inspected and are not subject to this notice
6. All Mach 5 forks with a Serial No. greater than # 5100149464 do not need further inspection and are not subject to this notice.
7. Post the enclosed notice in your store(s) in a conspicuous place. for at least 120 days.
8. Call Answer Products at (800) 423-0273 to get a RA (Return Authorization) for product that requires inspection or rework. RA numbers and shipping instructions will be issued immediately via phone by your Customer Service or Sales Representitive. The cast ing replacement will be done at no charge.
9. Send the forks that need inspection to ANSWER PRODUCTS, INC. 28209 AVENUE STANFORD, VALENCIA, CA 91355. Write "M-5 REWORK"on the package for quick identifica tion and turnaround. For forks on assembled bike, it is recommended that the crown steerer remain on the bicycles and just the stanchion/leg assembly is returned for inspection or rework. All work and parts required will be replaced at No Charge.



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